

HYTORC

The World's Most Trusted Industrial Bolting Systems



LITHIUM SERIES® II Electric Torque Tool User Interface Guide

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SWITCHES



CONTROL PANEL



DUAL SPEED SWITCH



SWITCHES

The Tool contains a speed switch, a directional control switch and a trigger. The speed switch allows the user to switch between Rundown (fast speed) and Torque (slow speed). The directional switch allows the user to switch between right-hand (clockwise) and left-hand (counter clockwise) rotation. The trigger is pulled and held to actuate bolting operations.

CONTROL PANEL

The control panel on the rear of the tool provides the primary user interface with high-resolution screen and three push buttons. The user configures all bolting functions displayed on the screens using the push buttons. A visible status LED and audible beeper also provide control indicators during operation.

POWER ON/OFF

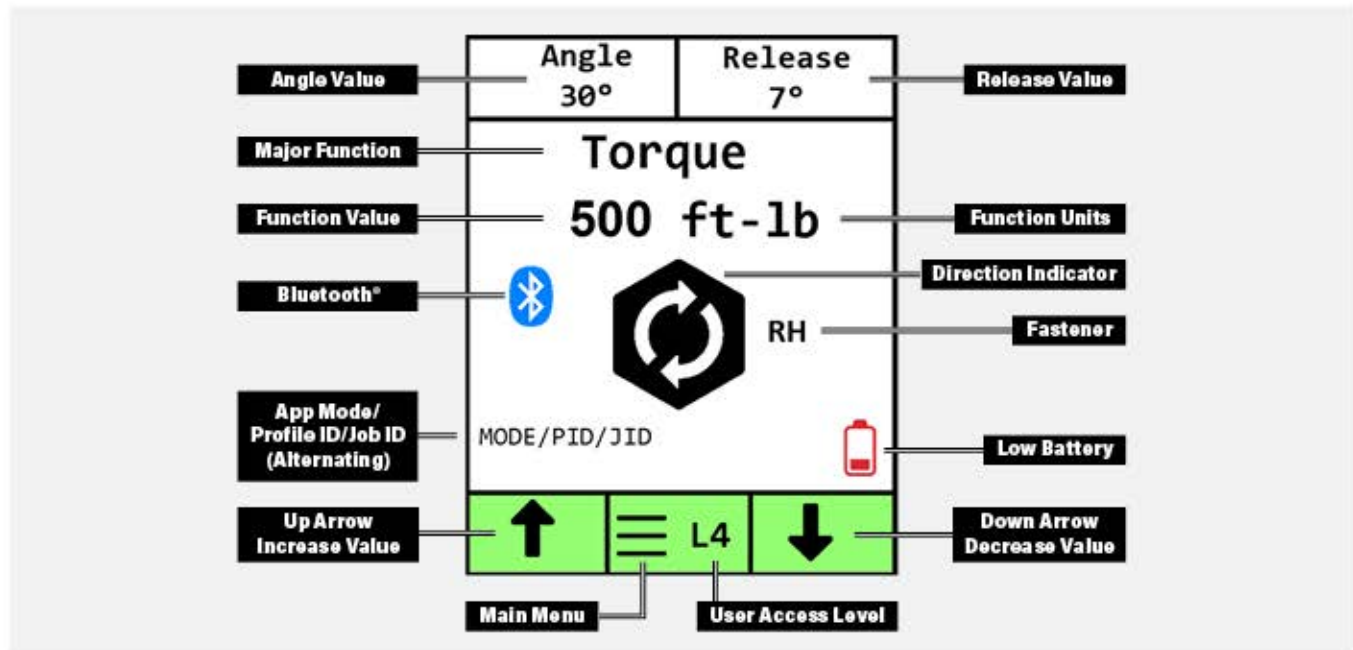
The tool is powered on by pushing any of the three Push Buttons. Power may be turned off from the Home Screen by pushing and holding the center button for approximately 3-seconds.

COMMUNICATION

The tool is equipped with both Bluetooth® Wireless Technology and a USB port. These communication channels provide a means for importing Job IDs and Profiles to the tool and exporting job data from the tool, as well as for firmware upgrade.

NOTE: Bluetooth® is a registered trademark of the Bluetooth® Special Interest Group.

The Home Screen for a Torque operation is shown below. The torque value can be adjusted up or down from the Home Screen by pressing the left and right buttons. Other related values and indicators displayed on the Home Screen are described in this section.



MAJOR FUNCTION

Torque is the primary function of the tool and is identified in the center of the screen. When the tool function is changed the major function label is changed to reflect an alternative function selected such as; Loosen, Snug, Turn Angle, Torque Check, Rotations, Run Down Forward, Run Down Reverse, etc.

FUNCTION VALUE AND UNITS

The major function value is shown below the function along with the units; e.g. 500 ft-lb.

ANGLE

The optional Angle set as part of a Torque & Angle operation is displayed in the upper left box. This is an angle that is applied within the same trigger pull as a torque operation; for example; Torque of 500 ft-lbs plus 30 degrees of angle.

RELEASE

The Release function is used to release a tool that is locked onto an application as a result of a torque or angle operation. The release is expressed as an angle in degrees. e.g. 7 degrees and displayed in the upper right box. The release motion is always applied in the opposite direction to torque and angle. Depending on specific tool settings and site conditions a release angle may or may not be necessary. The exact release value is usually determined by the specific conditions at the job site.

FASTENER

Displays fastener type including Right Hand (RH), Left Hand (LH), HYTORC Washer RH (HWR), HYTORC Washer LH (HWL) and HYTORC Nut (HN).

DIRECTION INDICATOR

Indicates direction of rotation (CW or CCW). Upon trigger pull, the arrows and the hex nut image rotate in the selected direction. The direction of rotation is determined by the fastener type and the directional switch.

BLUETOOTH® INDICATOR

Indicates Bluetooth® Wireless Technology is active. Black icon indicates Bluetooth Classic. Blue icon indicates Bluetooth Low Energy.

APP MODE

Indicates that App Mode is enabled. Displayed in alternating intervals in same position as Job ID and Profile ID.

JOB ID

An identifier up to 8 characters is displayed when the tool is recording to a specified job record. Displayed in alternating intervals in same position as App Mode and Profile ID.

PROFILE ID

An identifier up to 8 characters is displayed when the tool is configured with that profile. Displayed in alternating intervals in same position as App Mode and Job ID.

LOW BATTERY WARNING INDICATOR

Appears when the battery charge is nearly depleted.

UP ARROW [↑]

Press the left button to increase the major function value.

DOWN ARROW [↓]

Press the right button to decrease the major function value.

MAIN MENU ICON

Sometimes referred to as the "Hamburger" Icon, indicates that pressing the center button opens the main menu.

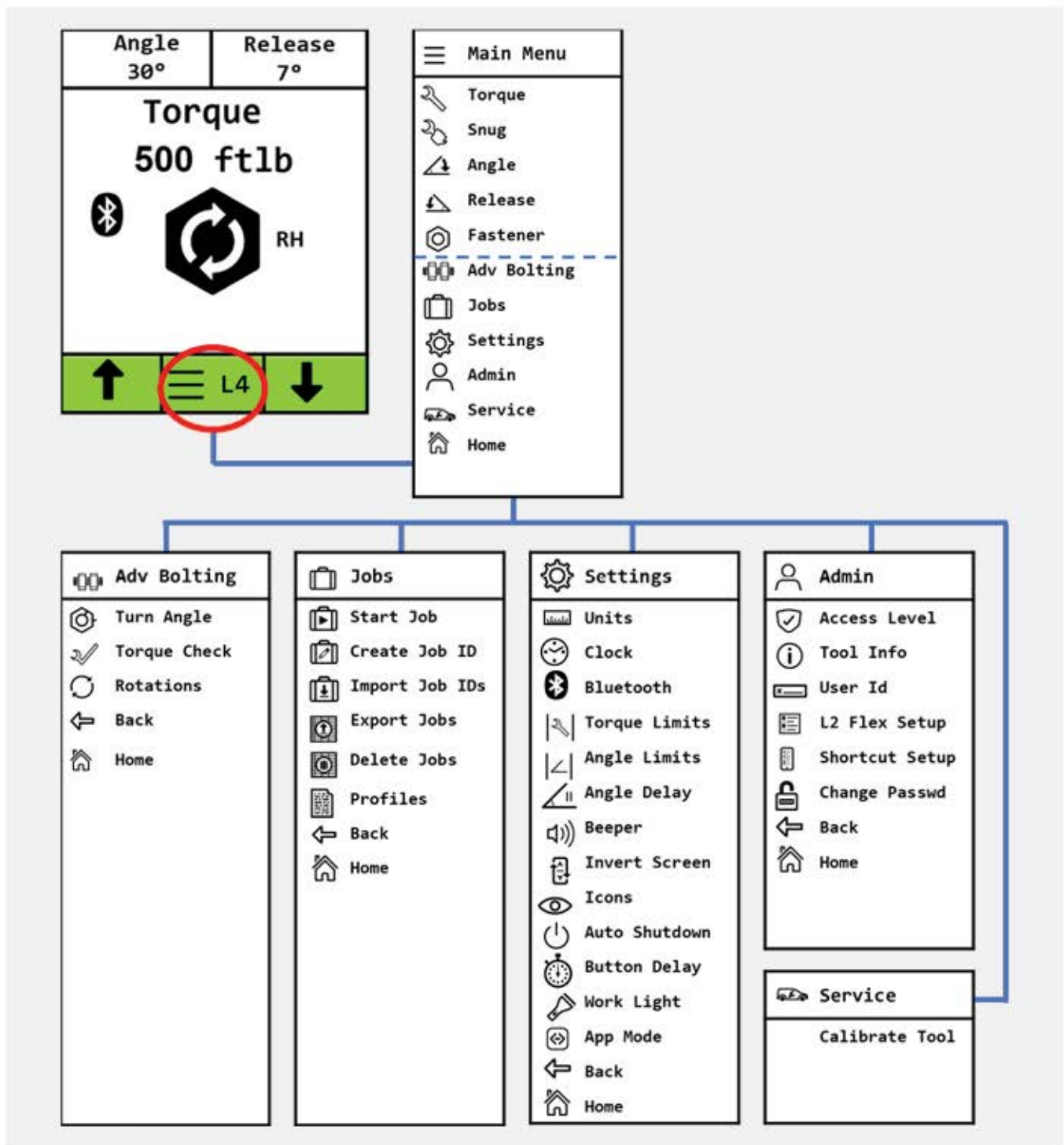
ACCESS LEVEL INDICATOR

Displays the current user access level set for the tool; e.g. L1, L2, L3, L4, L5.

HOME SCREEN VARIATIONS

Most all major bolting functions follow a similar Home Screen layout and presentation format. The layout of the advanced bolting functions on the Home Screen may look somewhat different depending on the parameters required for the display.

HOME SCREEN



This guide provides instructions for operating the tool using the menu system and functions shown on this page. This menu structure allows users to quickly access bolting functions starting with the Home Screen and working through the main menu and sub-menus.

An alternate menu structure may be defined by an administrator using the Shortcuts Options. This allows creation of a primary menu that may be used in place of the Main Menu with options selected by the Admin.

MAIN MENU

The Main Menu is accessed from the Home Screen by pressing the center button below the "hamburger" icon. The Main Menu includes Basic Bolting functions (Torque, Snug, Angle, Release Angle, Fastener Type) and additional options as assigned by the Administrator.

ADVANCED BOLTING SUB-MENU

The Advanced Bolting sub-menu contains specialized bolting options such as Turn Angle, Torque Check and Rotations.

JOBS SUB-MENU

The Jobs sub-menu allows the user to start and end job data recording, create, and import Job IDs, select, create, import, export and delete jobs and access profile options.

SETTINGS SUB-MENU

The Settings sub-menu provides a variety of options typically used upon initial setup or for a particular job.

ADMIN SUB-MENU

The Admin sub-menu provides options to manage passwords and tool access levels, and to configure the menu options available to a Level 2 (Flex) user and those available on the shortcut menu. It also provides users at all access levels with tool information such as firmware versions, the ability to change Access Level, and to add or change a User ID.

SERVICE SUB-MENU

The Service sub-menu provides options for HYTORC service personnel to configure, calibrate and troubleshoot the tool. Only the Calibration option is available to customers on the service menu, and only when at the Admin L4 access level.

SHORTCUT MENU

A Shortcut Menu may be implemented by the administrator to provide users with their own customized Main Menu.

The Main Menu displays primary basic bolting functions and other primary sub-menus.

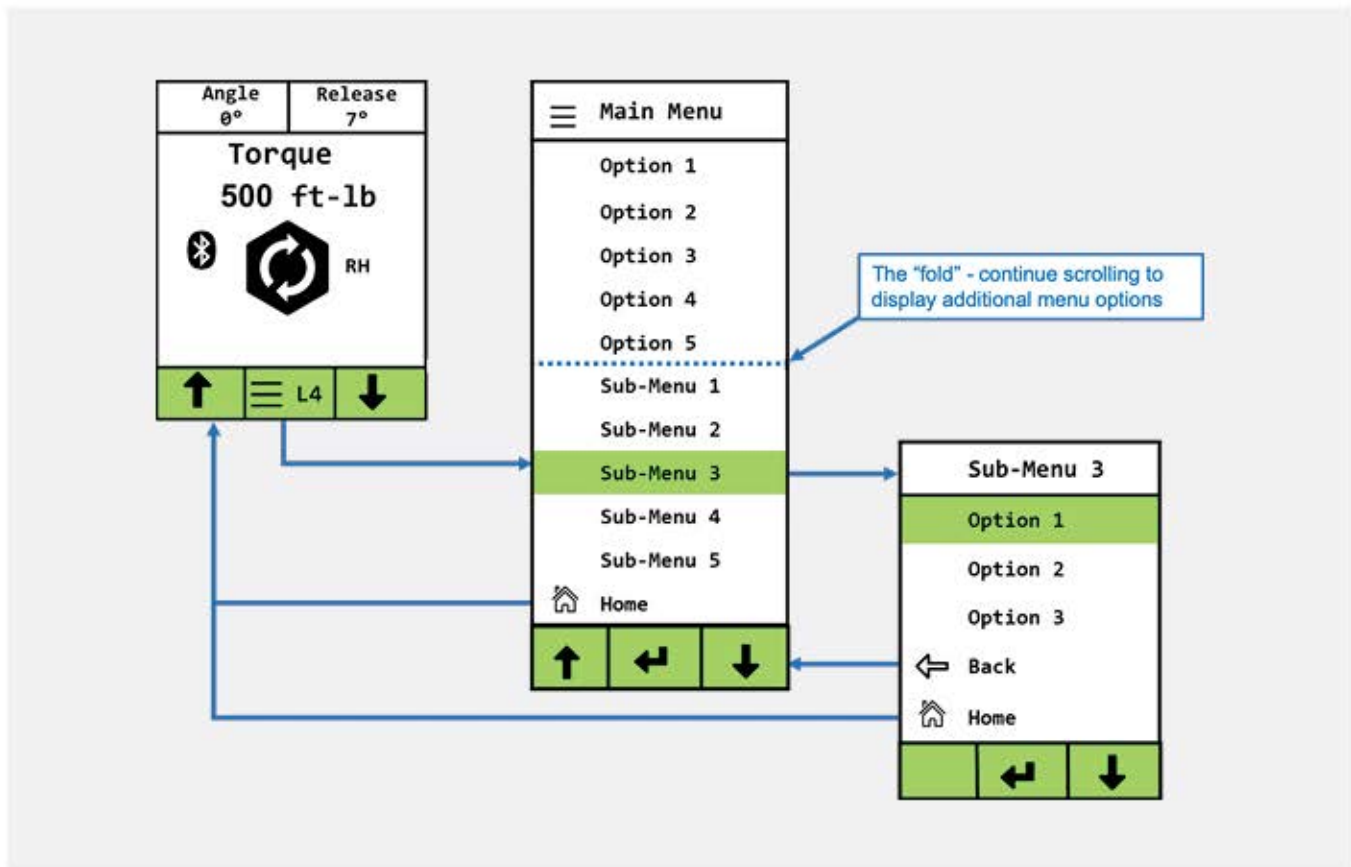
From the home screen, push the center button to display the Main Menu. Push \uparrow and \downarrow to scroll and highlight the bolting function or sub-menu desired. The green color bar highlights the current selection. Push the center button to select.

The Main Menu and some other sub-menus have more options available below those initially displayed. These options are referred to as "below the fold." To access menu selection below the fold continue to press the right button and scroll down. Also once the user has scrolled below the fold they can scroll back up by pressing the up arrow.

Press the center button to select the bolting function or sub-menu option desired.

Select Back to return to previous menu.

Select Home to return to the Home Screen.

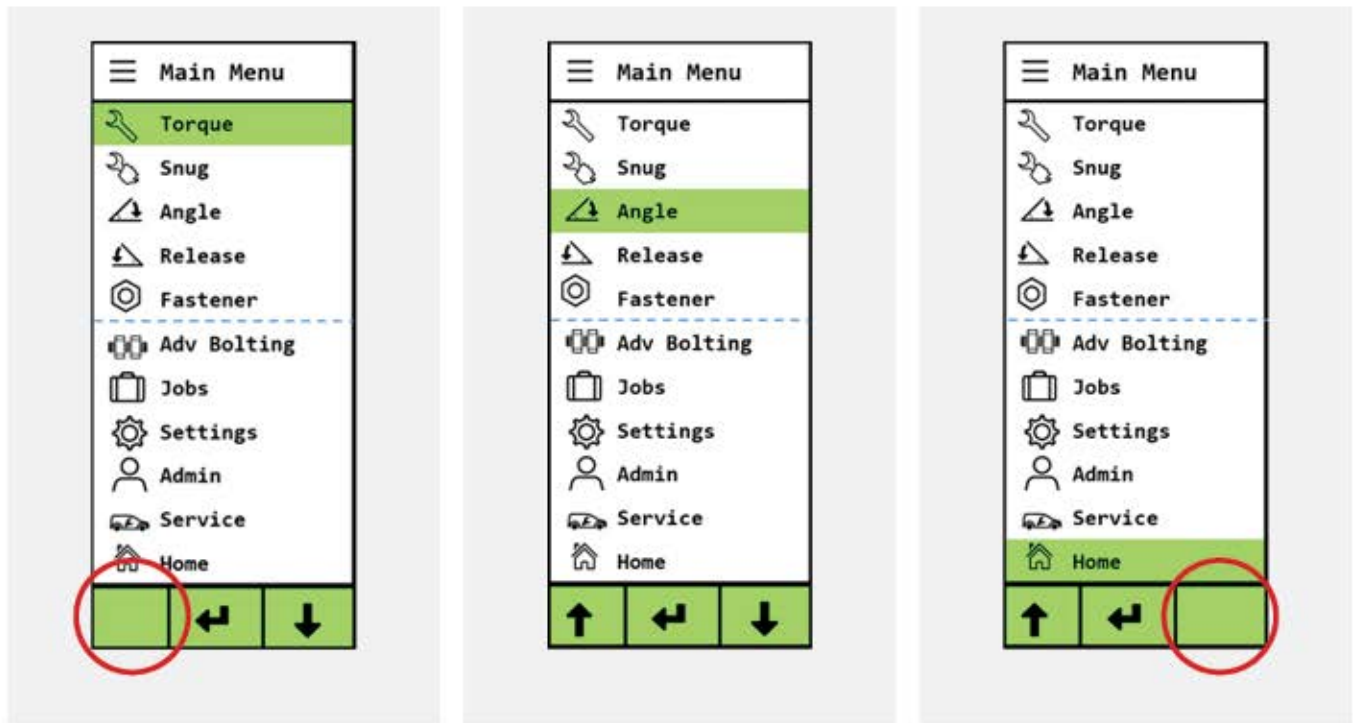


SCROLL BELOW FOLD

Where menus are longer than can be displayed on one screen, continue scrolling "below the fold" to display additional options lower on the menu.

TOP-TO-BOTTOM AND BOTTOM-TO-TOP SCROLLING

The menu is navigated by scrolling from top to bottom or from bottom to top. When the user reaches the top or bottom of the menu the corresponding arrow disappears indicating that no further scrolling in that direction is possible.



TOP

When highlighting the top menu option, the up arrow disappears indicating no more options above.

MIDDLE

Both up and down arrows are displayed when scrolling in between top and bottom menu options.

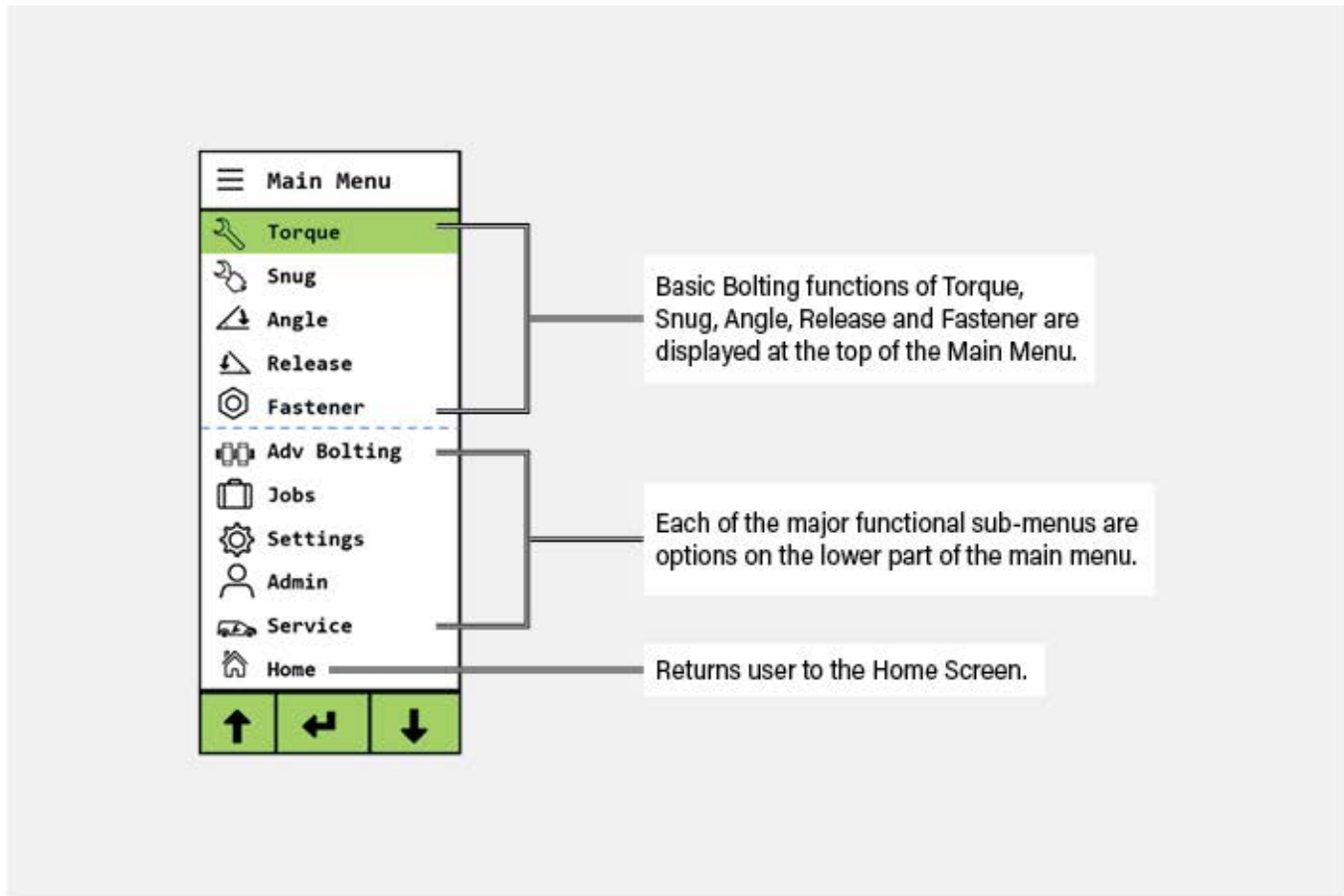
BOTTOM

When highlighting the bottom menu option, the down arrow disappears indicating no more options below.

MENU ICONS

Menu icons are intended to speed user access and aide non-English speaking users to locate menu options. A glossary of menu icons in multiple languages is provided.

The Main Menu provides all Basic Bolting functions including Torque, Snug, Angle, Release and Fastener. It also provides primary sub-menu options including Advanced Bolting, Jobs, Settings, Admin and Service.

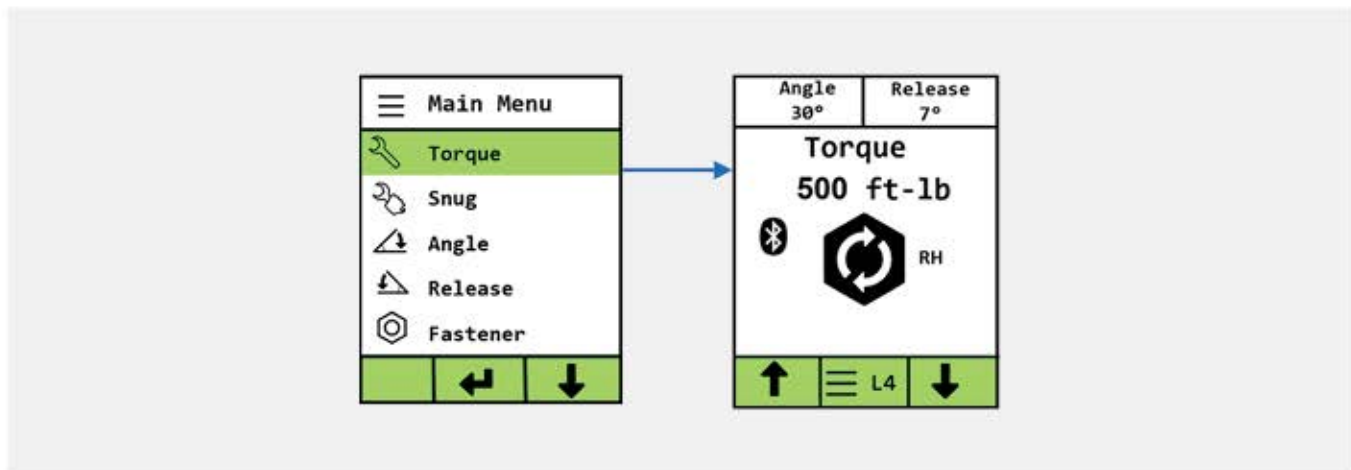


TORQUE

The Torque function can be adjusted directly from the Home Screen and also may be accessed from the Main Menu. Adjust the torque value using the left and right buttons to increase or decrease the torque to the nearest ft-lb (or other unit selected in the settings menu). The Torque value may be adjusted from the minimum to the maximum calibrated value of the tool. The Torque value is subject to limits set in the Settings menu.

A release angle may be included in the Torque operation to take the tension off the motor allowing the tool to be released from the application. The Release may be adjusted as needed through the Release option on the Main Menu. The Torque function may also include an optional angle applied within the same trigger pull. During a Torque operation with Angle and/or Release, the Torque value is always applied first followed by Angle and then Release.

While adjusting the Torque value, if the user continues to hold the right button after reaching the minimum Torque value the screen changes to the Snug function. The Snug function allows the user to continue to decrease torque but at an accuracy less than the calibrated Torque function.

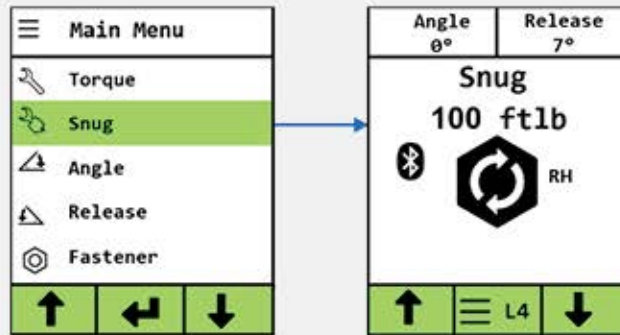


SNUG

The Snug function is used to bring two bolting surfaces into alignment and contact. It may also be used to tighten bolts at a lower torque. In structural bolting, the snug operation is applied first to bring surfaces into contact followed by either a calibrated torque or "Turn-of-Nut" (Turn Angle) method to fully tighten the fastener to specification.

The Snug function may be selected from the Main Menu or may be displayed when the user scrolls below the lowest calibrated value on the Torque screen. When the user enters Snug through the Main Menu, the minimum Snug value is displayed. The user can adjust the value using the left and right buttons to the nearest ft-lb (or alternate unit). Angle may be used with Snug by adjusting the value via the Angle menu option. The user can adjust Release angle as needed to release the tool from the application. If the user requires more torque than provided by the Snug function they can continue to push the left button to return to the Torque function.

The Snug range is defined from the minimum reliable output of the tool to the minimum calibrated value for the tool. When the tool is operating in the Snug range, the accuracy is less than in the calibrated range as defined in the documentation for each tool. The Snug value will be retained in the tool until it is changed.

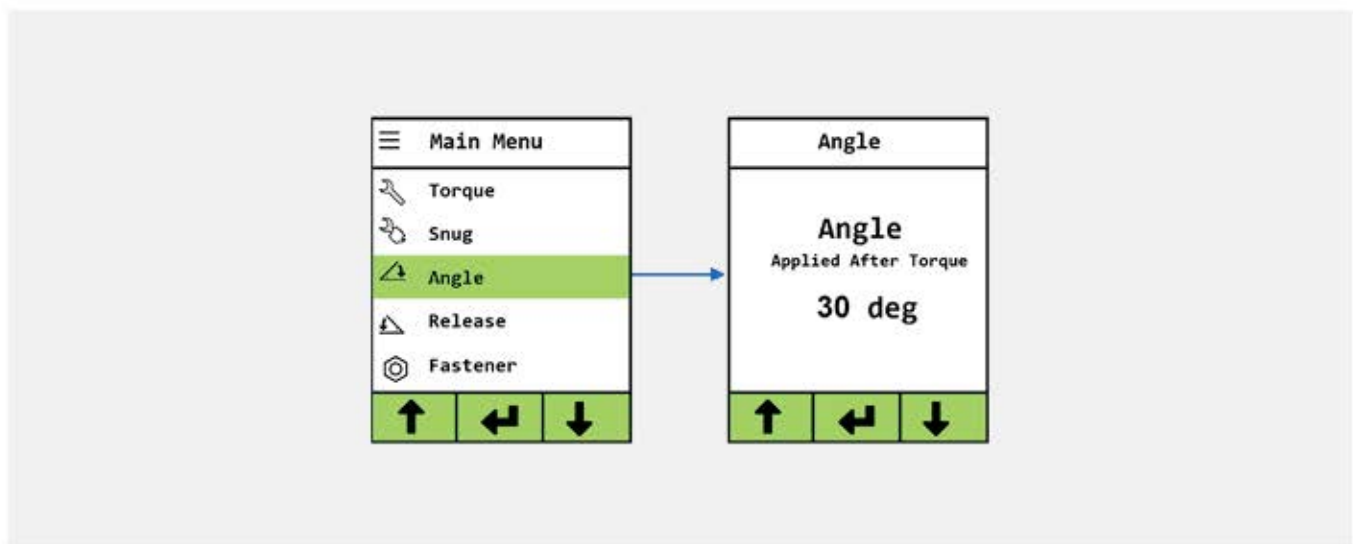


ANGLE

The Angle sub-menu allows the user to adjust the angle to the nearest degree, from 0 to 360 degrees. The Angle selected on this screen is always applied in a "Torque and Angle" sequence within the same trigger event as the Torque operation. The Angle value is subject to the Angle limits set in the preferences menu.

Press the center button to select the Angle and return to the primary menu. The angle value is displayed in the box in the upper left of the screen. The Angle value is saved in the tool and will be displayed the next time the user selects the Angle option from the menu.

Just as with Torque, a Release value is required following Angle. During a Torque, Angle and Release operation in the same trigger pull, Angle is always applied after Torque and before Release. The Angle always turns the nut in the same direction as Torque.



RELEASE

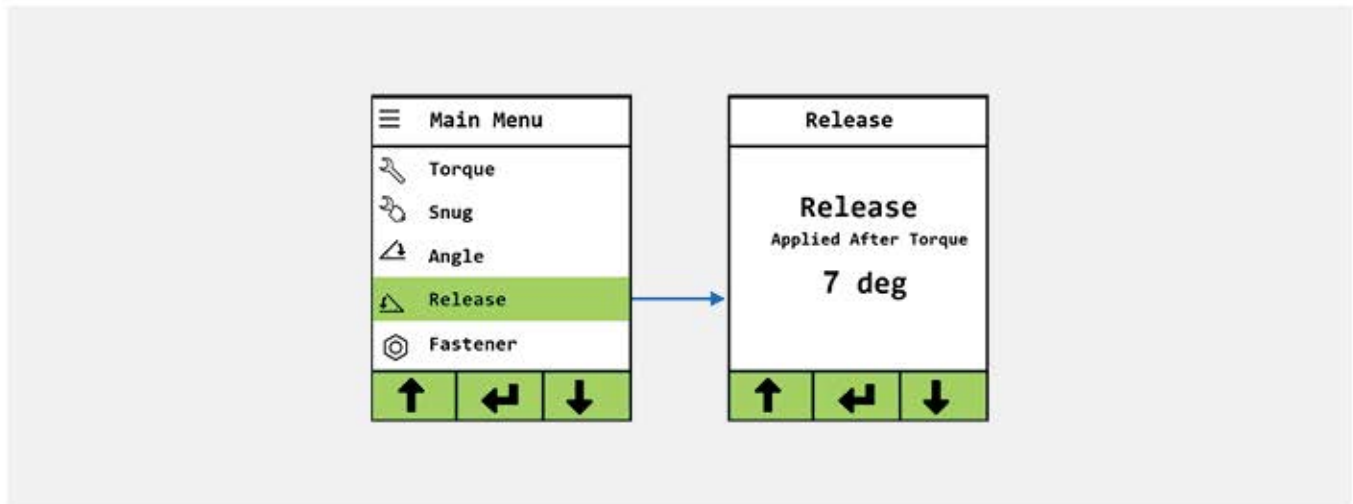
The Release angle takes the tension off the motor, causing the tool to automatically be released from the bolt following a tightening operation.

Release is set at the user's discretion and may not always be required. Typically the user tests a bolt on a particular job to determine the magnitude of the release angle needed. In typical applications the release is set between 5 and 7 degrees.

NOTE: the Release angle is subject to minimum and maximum Angle Limits set in the settings menu.

When the user returns to the Home Screen they will see the release angle displayed and labeled in the upper right of the screen. The Release angle selected is saved in the tool until changed to another value. Release may be used in conjunction with tightening functions such as Torque, Angle, Snug, Turn Angle, Torque Check and Rotations.

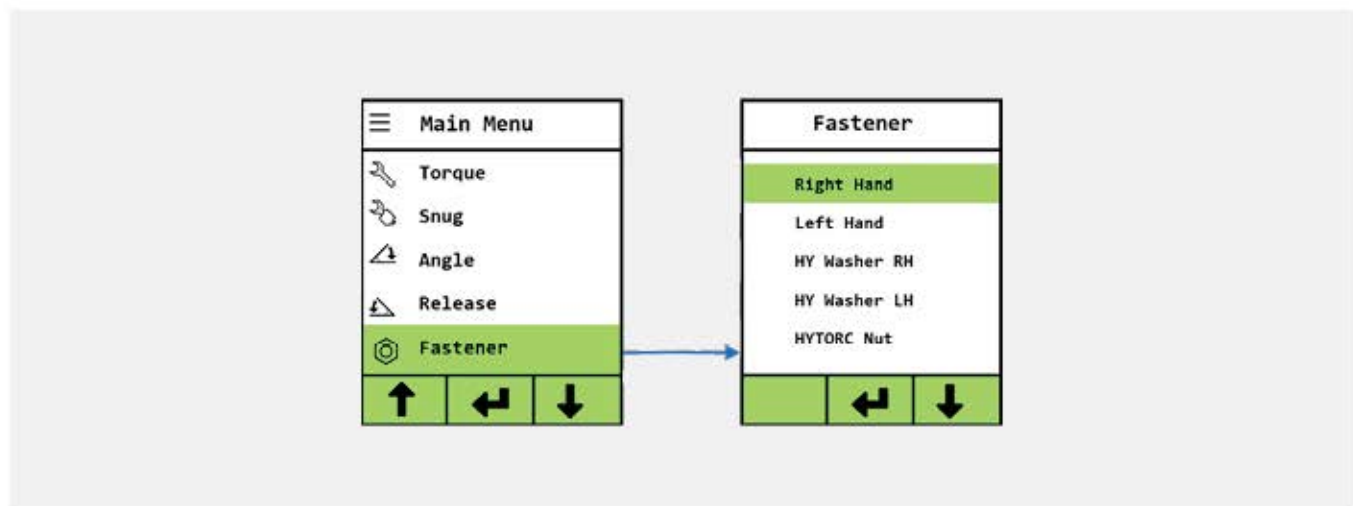
When a non-zero release angle is specified it is applied after the tightening bolting function and always acts in the opposite direction of the tightening operation.



FASTENER

The fastener option displays fastener types and defines the direction of rotation. The user scrolls, highlights and selects the desired fastener type. When the user returns to the Home Screen the abbreviation of the fastener type is displayed on the screen. The fastener is set by default to RH, the most common type in practice. When the user selects another fastener, this setting is saved in the tool until changed by the user. The fastener selection along with the position of the directional switch determines which direction (CW or CCW) the motor must turn to tighten the fastener. The fastener type also dictates which accessory is required for a bolting operation. The fastener type is abbreviated for display on the Home Screen as shown in the table below.

FASTENER TYPE	ABBREVIATION	TIGHTEN DIRECTION	REQUIRED ACCESSORY
Right Hand	RH	Clockwise	Reaction Arm
Left Hand	LH	Counter Clockwise	Reaction Arm
HYTORC Washer Right Hand	HWR	Clockwise	HYTORC Washer Driver
HYTORC Washer Left Hand	HWL	Counter Clockwise	HYTORC Washer Driver
HYTORC Nut	HN	Counter Clockwise	HYTORC Nut Driver



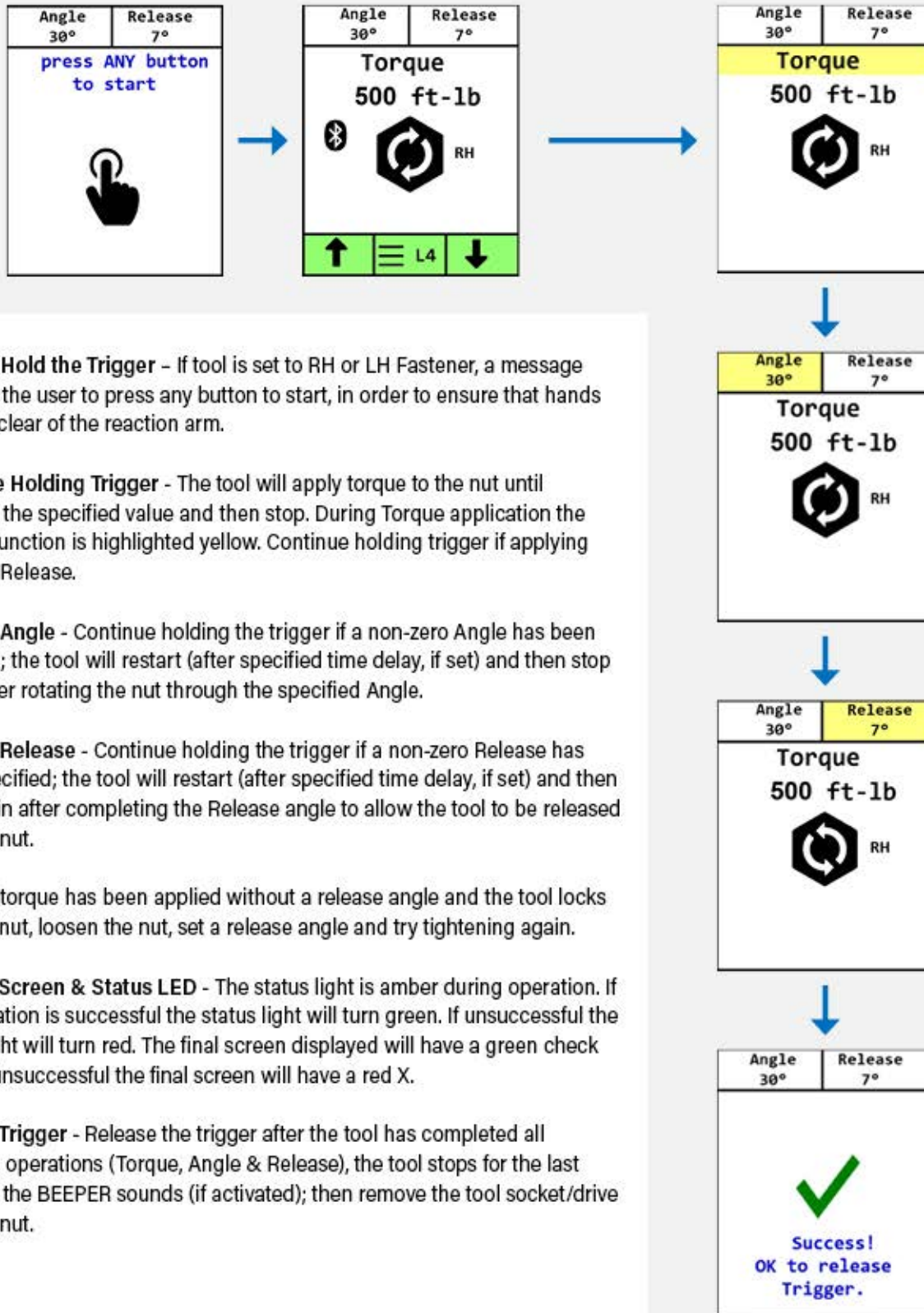
For traditional RH or LH fasteners, the tool assumes use of reaction arms and displays a safety message, "Press any button to start operation," to keep the user's hands away from any pinch point. For the HYTORC Washer (HWR, HWL) and the HYTORC Nut (HN) a reaction arm is not required and the safety message is not displayed.

BASIC BOLTING SETUP



- **Adjust Tool Parameters** - Select the desired configuration including Torque and Fastener and optionally Angle and Release.
- **Rundown** - Thread the nut onto the stud until positioned tight against the flange. When using the tool to run down the nut set the speed control to "RUNDOWN" and position the tool on the nut - pull the trigger to quickly run down the nut until it touches against the flange. When finished, set the speed control switch to TORQUE.
- **Position Back Wrench** - If needed, apply a back wrench to the back nut on the bolt to prevent it from turning during tightening. If using the HYTORC Back Washer a back wrench is unnecessary.
- **Position Drive/Socket** - Place socket over nut until firmly engaged. If using the HYTORC Washer or HYTORC Nut, make sure the driver properly engages the fastener.
- **Position Reaction Arm** - If a reaction arm is used, make sure it is firmly abutted against a stationary object (e.g. an adjacent nut, flange, equipment housing etc.).

TIGHTENING WITH TORQUE



- **Pull and Hold the Trigger** - If tool is set to RH or LH Fastener, a message instructs the user to press any button to start, in order to ensure that hands are kept clear of the reaction arm.
- **Continue Holding Trigger** - The tool will apply torque to the nut until reaching the specified value and then stop. During Torque application the Torque Function is highlighted yellow. Continue holding trigger if applying Angle or Release.
- **Hold for Angle** - Continue holding the trigger if a non-zero Angle has been specified; the tool will restart (after specified time delay, if set) and then stop again after rotating the nut through the specified Angle.
- **Hold for Release** - Continue holding the trigger if a non-zero Release has been specified; the tool will restart (after specified time delay, if set) and then stop again after completing the Release angle to allow the tool to be released from the nut.

NOTE: If torque has been applied without a release angle and the tool locks onto the nut, loosen the nut, set a release angle and try tightening again.

- **Monitor Screen & Status LED** - The status light is amber during operation. If the operation is successful the status light will turn green. If unsuccessful the status light will turn red. The final screen displayed will have a green check mark. If unsuccessful the final screen will have a red X.
- **Release Trigger** - Release the trigger after the tool has completed all specified operations (Torque, Angle & Release), the tool stops for the last time and the BEEPER sounds (if activated); then remove the tool socket/drive from the nut.

LOOSEN BOLT

- **Setup Tool** - Use the menu to specify the fastener type; e.g. LH, RH, HYTORC Washer.
- **Set to Loosen** - Toggle the direction switch to change from TORQUE to LOOSEN. The tool automatically sets the Loosen Torque to the maximum calibrated value of the tool. The Loosen value may be adjusted by pressing the right or left button to decrease or increase the value.
- **Position Back Wrench** - If needed, install back wrench to keep the back nut from turning.
- **Position Tool on Nut** - Make sure tool socket/driver is properly positioned on the nut.
- **Position Reaction Arm** - If a reaction arm is used, make sure the reaction arm is firmly abutted against a stationary object (e.g. an adjacent nut, flange, equipment housing etc.).
- **Pull Trigger to Loosen** - If a RH or LH fastener has been specified the operator will be asked to push any button to start. Press any button and continue to hold the trigger to carry out the loosening operation.
- **Monitor Status** - The status light is green in the loosen mode. Once the trigger is pulled the status light turns amber during the operation. A status light turning red indicates an error.
- **Release Trigger** - When the bolt is sufficiently loosened release the trigger to stop loosening and verify nut is completely loose.



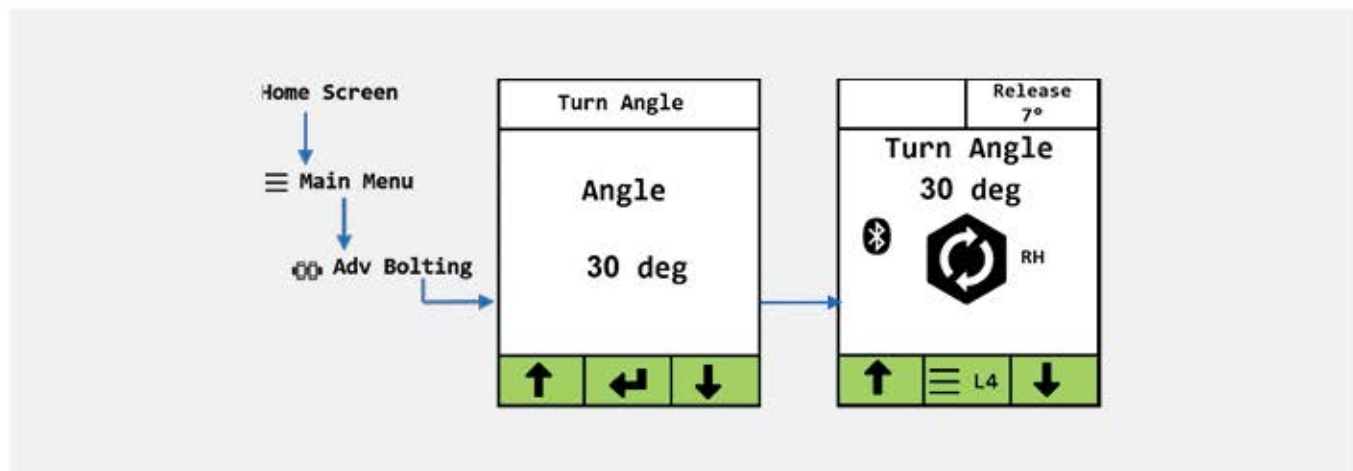
The Advanced Bolting menu contains additional bolting functions that allow the tool to be used in a broad range of applications. Some advanced functions may require additional training or support beyond that required for Basic Bolting. In some cases Advanced Bolting functions may be specialized for a particular application or industry.

TURN ANGLE

The Turn Angle function allows the user to tighten a fastener by turning a nut through a specific pre-engineered angle independent of the torque that has been previously applied. This function is often used with "Turn-of-Nut" procedures, standard in many structural applications. These approaches are most often two-step procedures where structural members are first snug-tightened to bring the surfaces into contact and alignment followed by Turn-of-Nut to apply load to the fastener.

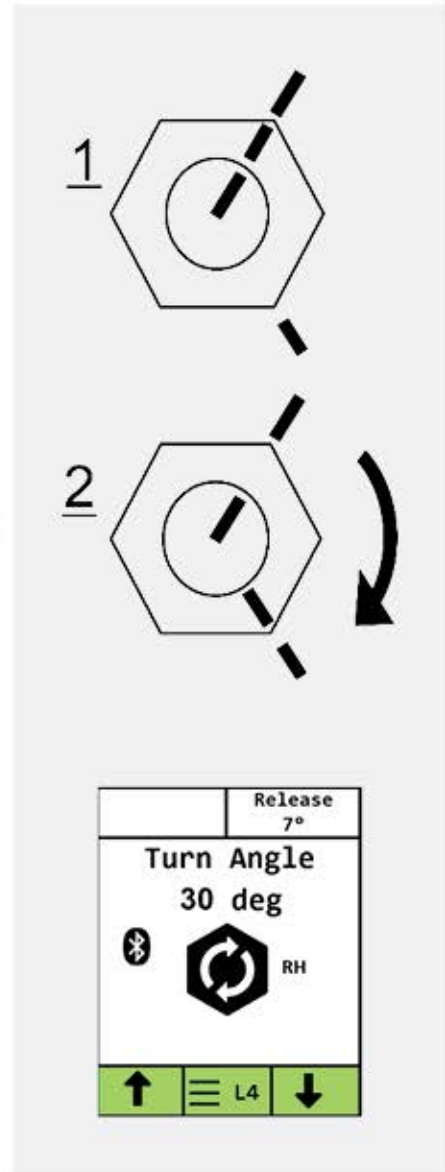
The Turn-of-Nut method is usually verified in the field with a load testing machine. The Turn-of-Nut method also may require match marking of the fastener to allow post installation inspection. See specific structural assembly guidelines for the specific job for these procedures.

In Turn-of-Nut applications the exact torque is not defined but rather the engineer of record calculates the specific angle required to apply the exact load to the fastener. The Turn Angle function is used to complete the Turn-of-Nut procedure by turning an already snug-tightened nut through the specified angle specified. The Turn Angle function is accessed through the Advanced Bolting menu. The technician simply adjusts the angle value and then returns to the Turn Angle screen.



SETUP FOR TURN ANGLE

- **Pre-Installation Verification** - A verification procedure is completed at the site according to requirements (or code) to confirm suitability of the fastener system for turn-of-the nut method. All components should be verified to ensure there is adequate power to easily complete the required turn. Contact the engineer of record for exact procedure required at the site.
- **Run Down Nut** - The nut is run down on the stud/bolt until positioned tight against the flange. Set the speed control to "Rundown" and position the tool on the nut. Pull the trigger to quickly run down the nut against the flange.
- **Snug Nut** - Switch the tool to Snug and apply necessary torque required to bring the bolting surfaces into firm contact and alignment. All nuts should be snug tight to the point where they cannot be loosened by hand.
- **Match Marking** - The angle is optionally "matched marked" on the application to provide a means of inspecting the angle after tightening. Consult local inspection guidelines for the exact match marking required. Since the tool provides a documented data file with verification of the angle turned the electronic data file may sometimes be allowed in place of match marking. Check with the engineer of record to determine if match marking is required.
- **Position Back Wrench** - If needed, apply a back wrench to the back nut on the bolt to prevent the back nut from turning during tightening. If using the HYTORC Back Washer a back wrench is unnecessary.
- **Position Drive/Socket** - Place socket over nut until firmly engaged. If using the HYTORC Washer or HYTORC Nut, make sure the driver properly engages the fastener.
- **Position Reaction Arm** - Make sure the reaction arm, if used, is firmly abutted against a stationary object (e.g. an adjacent nut, flange, equipment housing etc.)

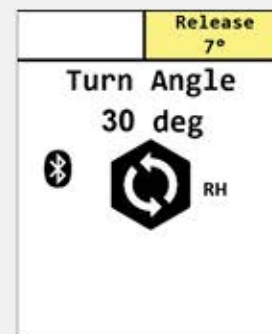
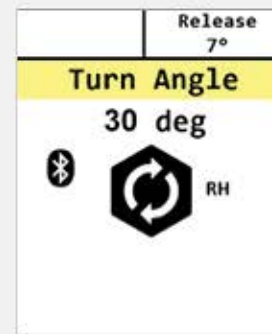
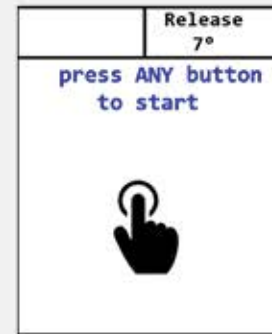


TIGHTENING WITH TURN ANGLE

- **Pull and Hold the Trigger** - If tool is set to RH or LH Fastener, a message instructs the user to press any button to start, in order to ensure that hands are kept clear of the reaction arm.
- **Turn Angle Tightening** - Continue holding trigger to apply Turn Angle. The tool will rotate the nut until it stops at the specified Angle value. When the trigger is pulled, the Turn Angle function is highlighted. Continue holding trigger if applying Angle or Release.
- **Hold for Release** - Continue holding the trigger if a non-zero Release angle has been specified. The tool will restart (after specified time delay) and then stop again after completing the Release angle to allow the tool to be released from the nut.

NOTE: If torque has been applied without a release angle and the tool may lock onto the nut, loosen the nut, set a release angle and tighten again.

- **Release Trigger** - Release the trigger after the tool has completed all specified operations (Turn Angle & Release), the tool stalls for the last time and the Beeper sounds (if activated); then remove the tool socket/drive from the nut.

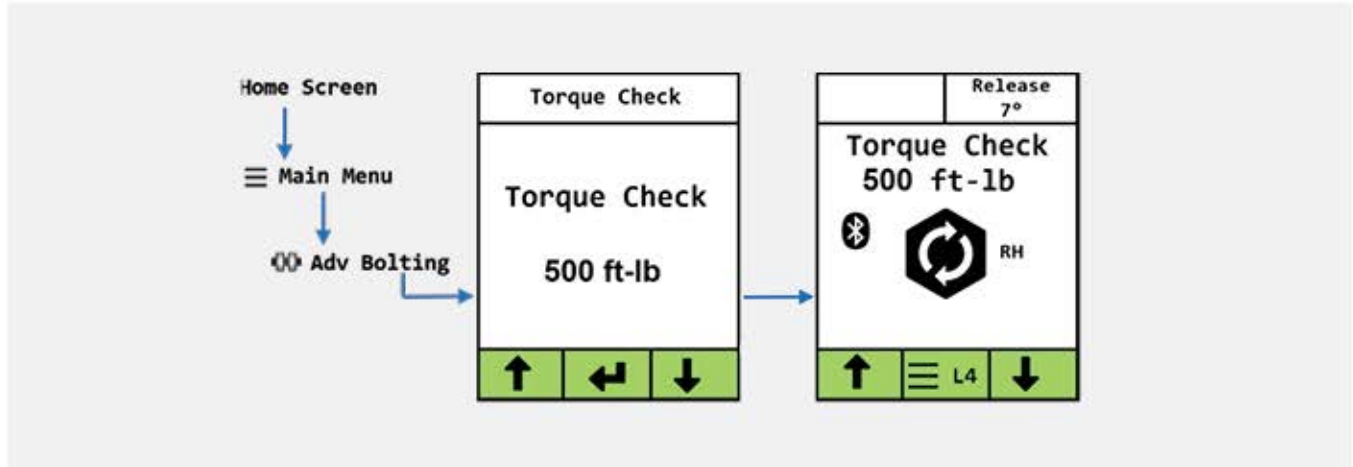


TORQUE CHECK

This function allows a user to determine whether a previously tightened nut still meets specification. In a typical application the user sets the Torque Check value to 10% lower than the specification value. The operator pulls the trigger and monitors the nut to detect any movement. Should movement be detected there is a good chance the nut has loosened and will require retightening.

When data/documentation is exported the profile type for Torque Check is "TCK" and the data file records a successful torque with the value checked.

NOTE: Torque Check is available on the LITHIUM SERIES II Tool 2000, 3000 and 5000 capacity versions.

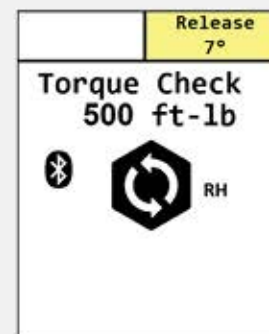
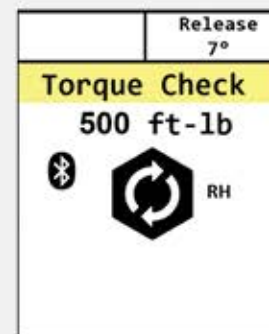
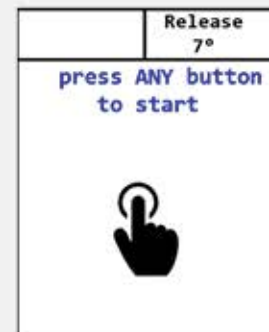


TIGHTENING WITH TORQUE CHECK

- **Pull and Hold the Trigger** - If tool is set to RH or LH Fastener, a message instructs the user to press any button to start, in order to ensure that hands are kept clear of the reaction arm.
- **Continue Holding** - The tool will apply torque and rotate the nut until the tool motor stops at the specified Torque value. During Torque application the Torque function is highlighted yellow. Continue holding trigger if a Release angle has been set. Observe the socket/nut during operation to see if any motion occurs.
- **Hold for Release** - Continue holding the trigger if a non-zero Release has been specified and the tool will restart (after specified time delay) and then stop again after completing the Release angle.

NOTE: If Torque has been applied without a Release angle and the tool locks onto the nut, loosen the nut, set a Release angle and try tightening again.

- **Monitor Screen and Status LED** - The status light is amber during operation. If the operation is successful, the status light will illuminate green; if unsuccessful the status light will turn red. The final screen displayed will have a green check mark. If unsuccessful the final screen will have a red X.
- **Release Trigger** - Release the trigger after the tool has completed all specified operations, the tool stalls for the last time and the Beeper sounds (if activated); then remove the tool socket/drive from the nut.



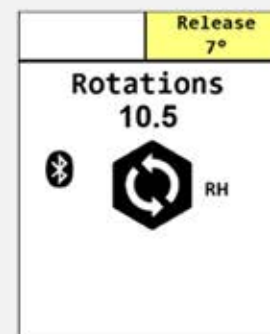
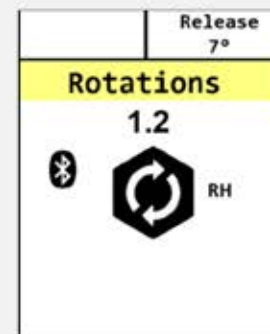
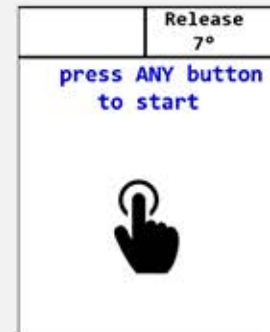
ROTATIONS

Rotations allows the user to turn a fastener under resistance through a specific number of rotations; for example to turn a valve 20 revolutions clockwise. The capacity of the rotations feature is 99.9 rotations. The rotations feature allows the user to adjust the resolution to the nearest tenth of a rotation.

- **Pull and Hold the Trigger** - If tool is set to RH or LH Fastener, a message instructs the user to press any button to start, in order to ensure that hands are kept clear of the reaction arm.
- **Continue Holding** - The tool will rotate the nut/bolt until completing the specified number of Rotations. When the trigger is pulled the Rotations Function is highlighted yellow. Continue holding trigger if applying Release.
- **Hold for Release** - Continue holding the trigger if a non-zero Release has been specified and the tool will restart (after specified time delay) and then stop again after completing the Release angle to allow the tool to be released from the nut.

NOTE: If torque has been applied without a Release angle and the tool locks onto the nut, loosen the nut, set a Release angle and try tightening again.

- **Monitor Screen and Status LED** - The status light is amber during operation. If the operation is successful the status light will illuminate green. If unsuccessful the status light will turn red. The final screen displayed will have a green check mark. If unsuccessful the final screen will have a red X and the operator will need to trouble shoot and/or try again.
- **Release Trigger** - Release the trigger after the tool has completed all specified operations (Torque, Angle & Release), the tool stalls for the last time and the Beeper sounds (if activated). Remove the tool socket/drive from the nut.



The Job function enables the tool to tag a specific bolting operation or sequence to record with a Job ID for documentation. The results of each bolting operation are recorded with the assigned Job ID together with the tool parameters.

JOB ID

A Job ID is a label assigned to identify a specific bolting job or application unit such as a plate, flange, beam, joint, hub, etc. The ID is an alphanumeric string of up to 8 allowable characters that can be entered directly via the tool's 3-button user interface, or typed on a PC and uploaded to the tool using the Import Job ID(s) option. The tool can maintain a maximum of 100 Job IDs.

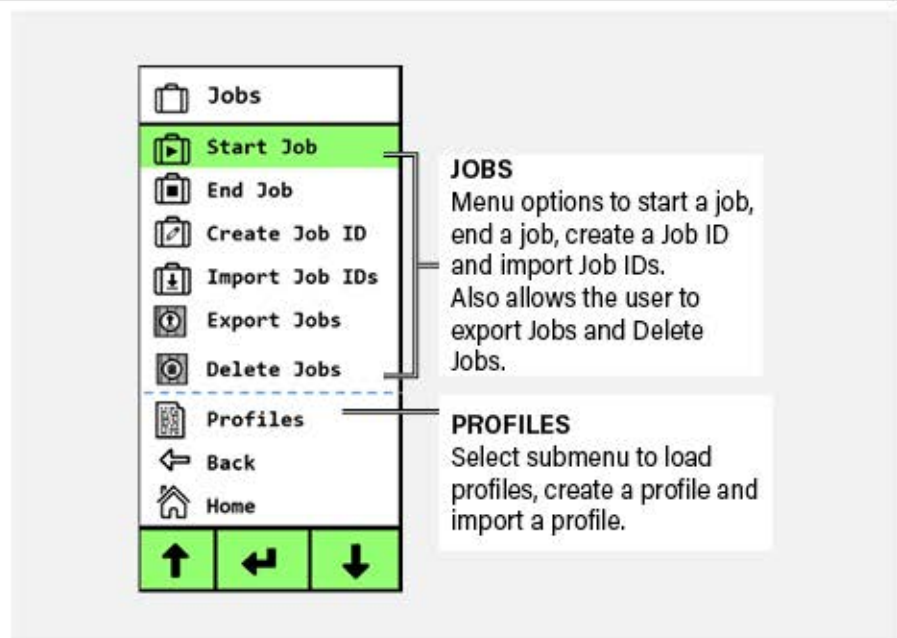
NOTE: If no Job ID has been selected, the Job ID "ADHOC" is assigned by default. Jobs with an ADHOC Job ID can be exported and deleted just like any other jobs.

JOBS MENU

The Jobs sub-menu provides options for starting and ending specific job data recording, creating and importing Job IDs, importing and exporting Job IDs and managing Profiles.

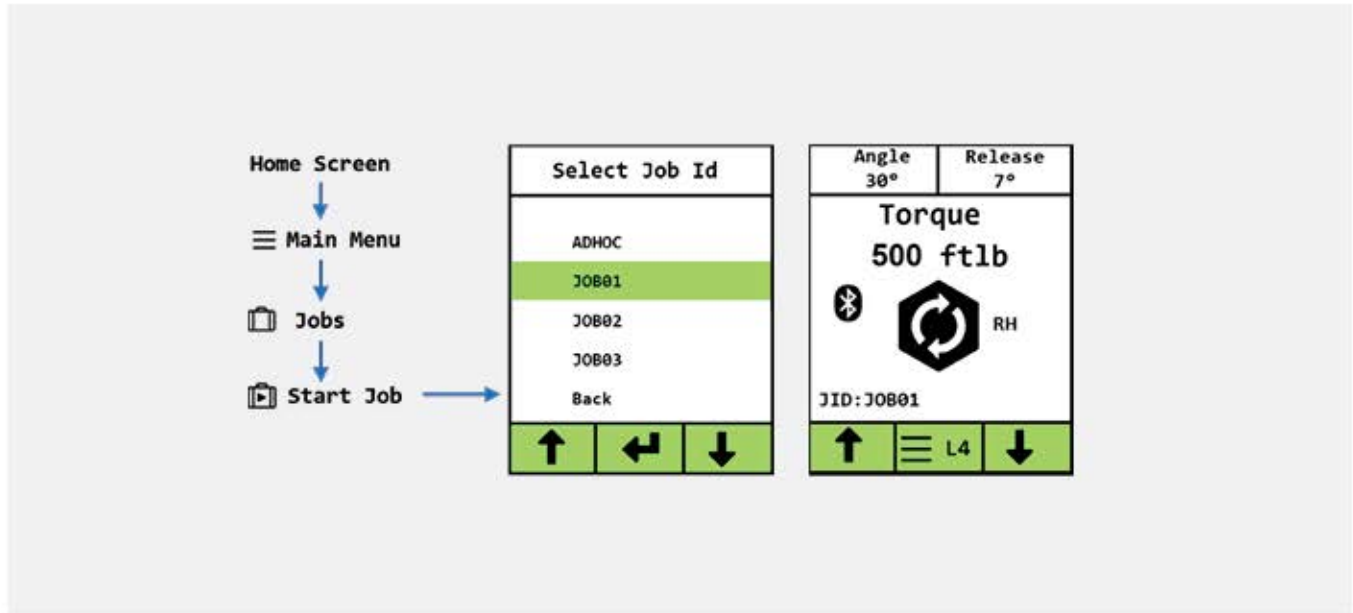
The Start Job and End Job menu options are not displayed at the same time. If no job is currently active, the Start Job option is displayed and operations are recorded under the Job ID "ADHOC".

If a Job ID is currently active, only the End Job menu option is available.



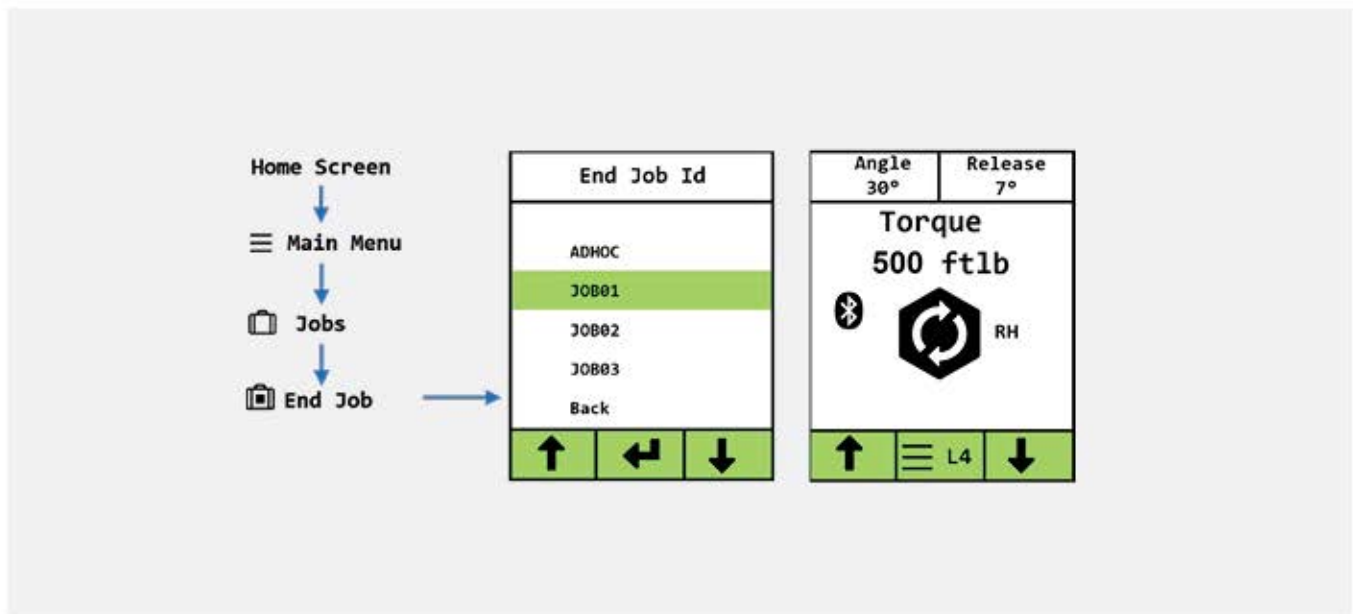
START JOB

The Start Job option allows the user to select a Job ID and begin recording data under that ID. The Job will use whatever Profile has been previously selected. When the user returns to the home screen the Job ID is displayed near the bottom of the screen. The tool will save event data under that Job ID until the End Job option is selected or another Job ID is selected.



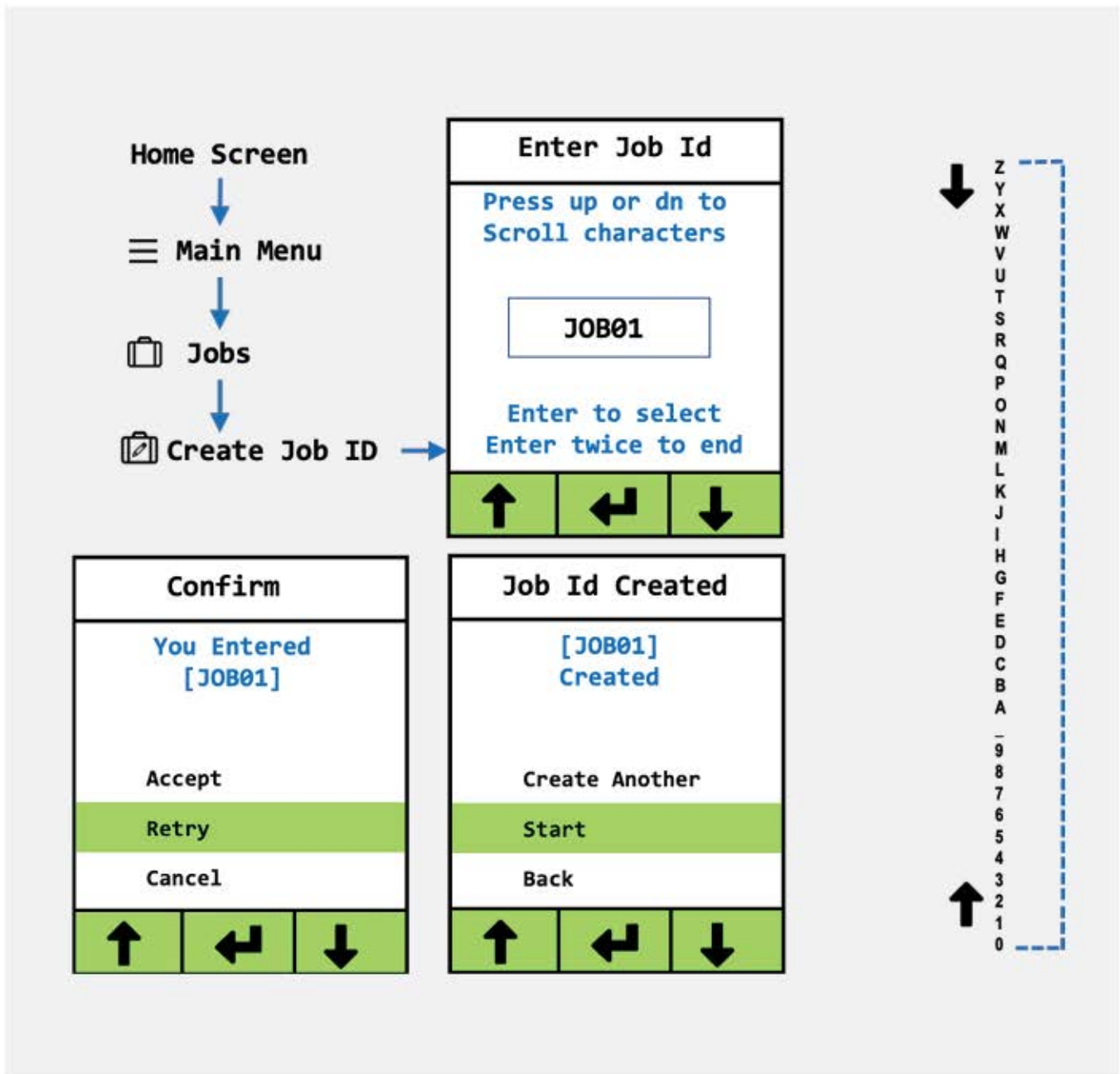
END JOB

The End Job option ends the active Job. The Job ID is no longer displayed on the Home Screen and subsequent bolting operations will be recorded with the default "ADHOC" Job ID.



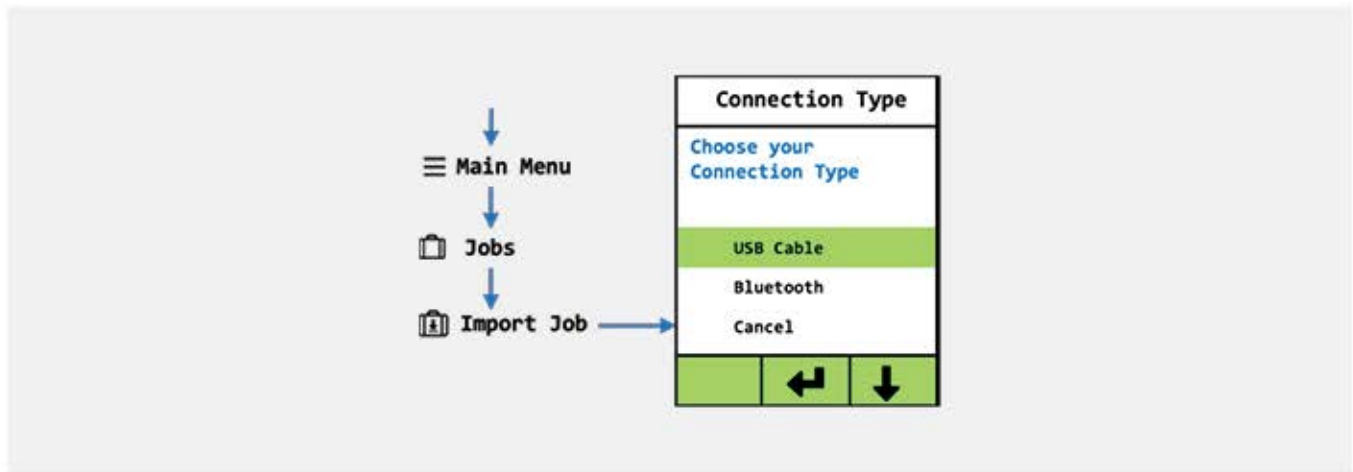
CREATE JOB ID

A Job ID consists of 1 to 8 character alpha numeric characters (0 to 9, _, and A to Z). A Job ID is selected one character at a time using the up arrow button (starting at 0) or the down arrow button (starting at Z) to scroll through the characters until the desired character is displayed. Once the desired character is displayed the character is selected by pushing the center button. The next characters are entered in the same way up to 8 characters. After the first character, the scroll for each subsequent character starts at the previous character. At any time the user can stop by pressing the center button twice to end the entry. The next screen asks the user to confirm the entry at which point they can accept, retry or cancel out of the job entry activity. If the user confirms they are prompted to create another Job ID, start the Job or go back to the Jobs menu.



IMPORT JOB IDS

The Import Job IDs option allows the user to load a file of one or more Job IDs from a PC via a USB cable. The required file format for import is CSV. Each row in the file will include a unique Job ID.

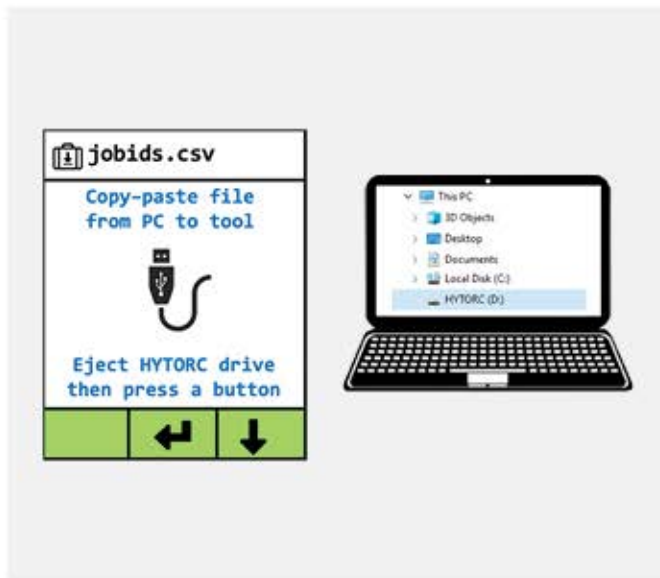


IMPORT JOB IDS - USB CABLE

Select Import Jobs > USB Cable. When the USB cable is connected the PC detects the tool as a device on the drive. Copy the JOBIDS.CSV file from the PC to the tool's drive.

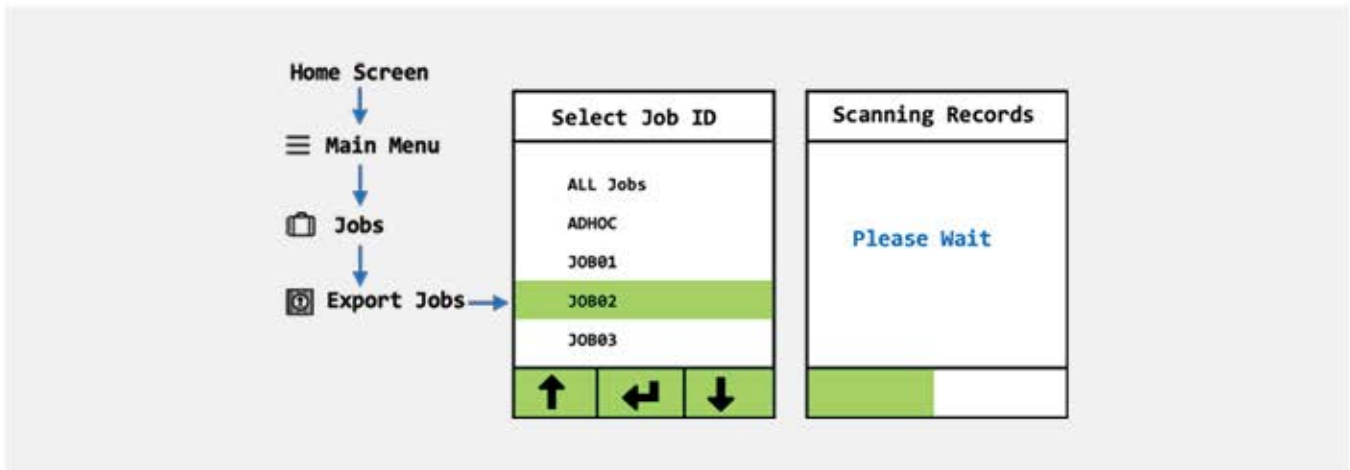
IMPORT JOB IDS - BLUETOOTH® WIRELESS

The user can Import Job IDs via Bluetooth using the HYTORC Connect App.



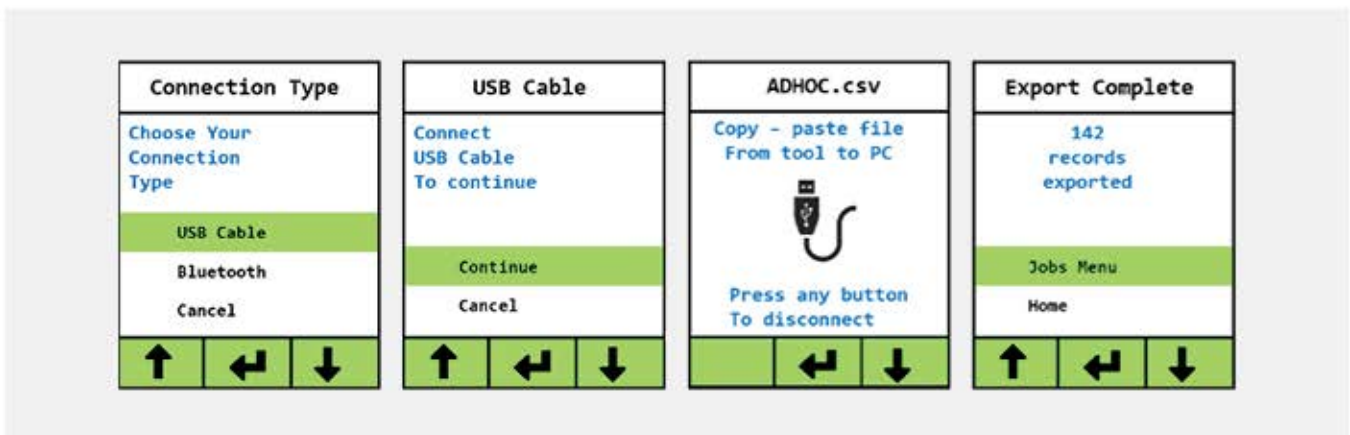
EXPORT JOBS

The Export Jobs option allows the user to generate a CSV file of all data corresponding to a Job ID and export the file to a PC via Bluetooth or USB cable. The user also has the option to export data from all Job IDs at once.



EXPORT JOBS - USB CABLE

Select Export Jobs > USB Cable. Once the cable is connected, the tool will appear on the PC as an external drive. Copy the desired CSV file from the tool to the PC and then press any button to disconnect. A final message is displayed when export is complete.



EXPORT JOBS - BLUETOOTH® WIRELESS

The user can export data via Bluetooth using the HYTORC Connect App.



JOB DATA FILE FORMAT

Job data is saved as a Comma-Separated Value (.CSV) file that can be opened in any standard spreadsheet program. The file will display the column headings shown below, with each row representing a separate trigger pull event.

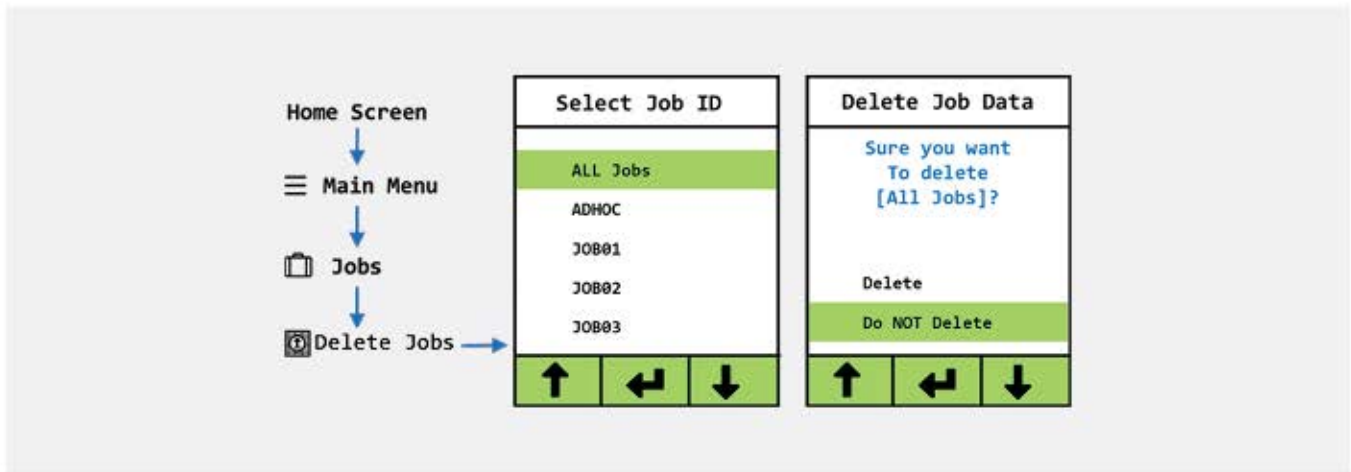
DATE	TIME	DURATION	JID	PID	PTYPE	TORQUE	ANGLE	RELEASE	FASTENER	UNITS	T/L	ROTATIONS	RESULT	FINAL TORQUE	LEVEL	USER ID
1/30/20	14:04:49	6	ADHOC	CWP	TAR	500	5	3	HWR	ft-lb	T		ETR		L4	TEAM_08
1/30/20	14:02:53	29	ADHOC	CWP	TAR	500	5	3	HWR	ft-lb	T		OK	518	L4	GIANTS21
1/30/20	14:01:32	23	ADHOC	CWP	TAR	600	10	5	HWR	ft-lb	T		OK	645	L4	DAVE
1/30/20	14:00:30	34	ADHOC	CWP	TAR	600	5	5	HWR	ft-lb	T		OK	590	L4	DAVE
1/30/20	13:59:37	5	ADHOC	CWP	TAR	300	5	5	HWR	ft-lb	L		OK		L4	DAVE
1/30/20	10:19:10	5	WHEEL003	CWP	TCK	500		5	HWR	ft-lb	T		OK	500	L1	JOE
1/29/20	14:07:18	2	WHEEL002	CWP	TAR	3000		5	HWR	ft-lb	R-L		OK		L4	
1/29/20	14:07:58	2	WHEEL002	I23ABC	TAR	500	5	5	HWR	ft-lb	R-T		ETR		L4	
1/28/20	14:19:16	32	TC1	CWP	TAR	900	5	5	HWR	ft-lb	T		OK	919	L4	
1/23/20	15:56:53	24	SNUG1	TEST8	SRF	150	0	7	HWR	ft-lb	T		ETR		L4	UID1234
1/23/20	15:56:25	3	SNUG1	TEST9	SRF	150	0	7	HWR	ft-lb	T		ME		L4	UID1234
1/23/20	15:55:21	13	SNUG1	TEST10	SRF	150	0	7	HWR	ft-lb	T		MHS		L2	UID1234
1/23/20	15:54:53	14	SNUG1	CWP	SRF	3000	0	7	HWR	ft-lb	L		OK		L4	UID1234
1/23/20	15:54:23	14	SNUG1	CWP	SRF	150	0	7	HWR	ft-lb	T		OK		L4	UID1234
1/13/20	12:20:26	13	R01	I23ABC	ROT			7	RH	ft-lb	T	0.4	OK		L4	ERAN
1/13/20	12:03:02	5	TAI	CWP	RAR		10	7	RH	Nm	T		OK	303	L3	RANDY

DATE	Month, day and year of the bolting operation (format: mm/dd/yy)
TIME	The time of the bolting operation (format: hh:mm:ss) (24hr)
DURATION	Time the motor was running during the bolting operation (in seconds)
JID	Job Identifier
PID	Profile Identifier
PTYPE	Profile Type designation associated with function. See page 31.
TORQUE*	Torque value set in the tool during operation
ANGLE	Angle value in degrees set in the tool for the operation
RELEASE	Angle value in degrees for releasing the tool
FASTENER	Fastener type (also defines direction of rotation)
UNITS	Units for torque (e.g. ft-lb, Nm, etc.)
T/L	Indicates if the tool was set to tighten or loosen
ROTATIONS	Number of rotations turned (reported only for Rotations operations).
RESULT	Indicates successful operation, or other message (see Appendix)
FINAL TORQUE*	Final reported torque.
LEVEL	Access level of the user completing the operation (L1, L2, etc.)
USER ID	User identification entered by the user; if supplied

* Available in future firmware release.

DELETE JOBS

The Delete Jobs feature allows the user to delete a single job or all jobs from the tool. Deleted Job data will no longer be accessible, except for diagnostic purposes.

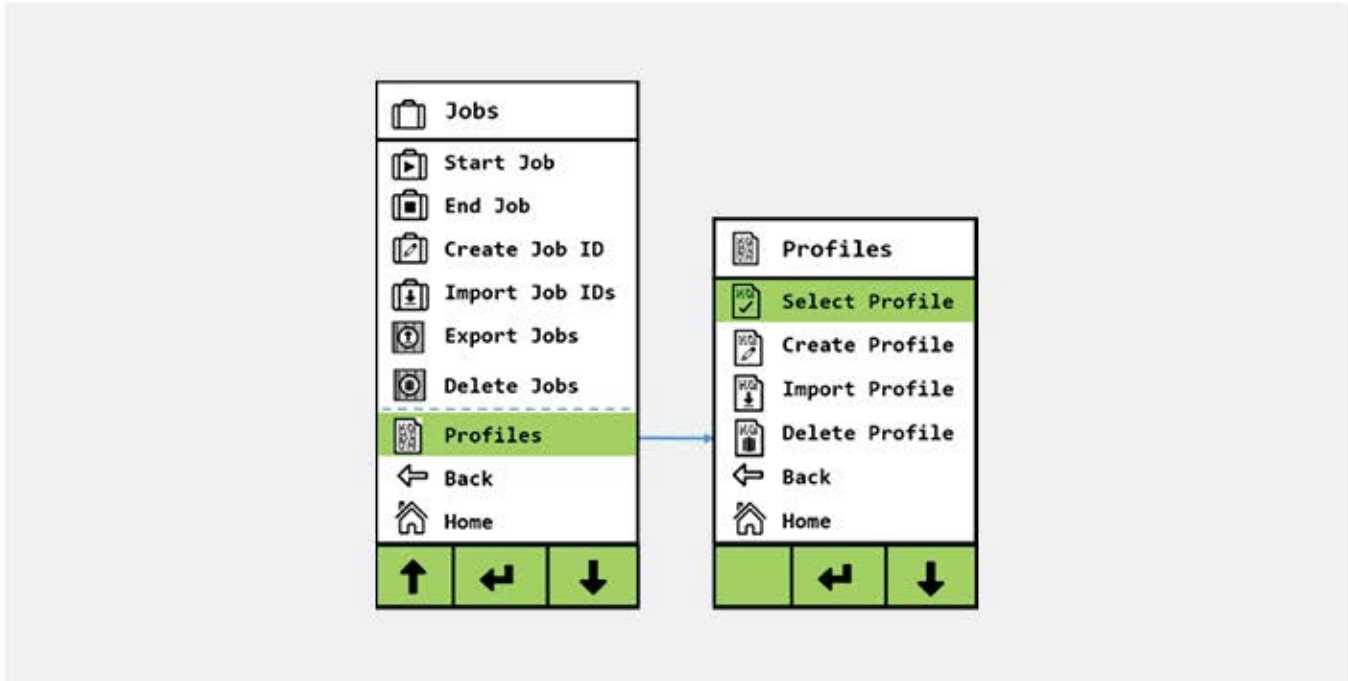


A Profile is a named, reusable set of tool parameters that may be easily recalled from memory for a particular bolting function or application. Each Profile is assigned a unique a Profile ID (PID) and Profile Type (PTYPE), along with the set of tool parameters required for each specific PTYPE.

The Profile menu is located just below the fold in the Jobs sub-menu. Selecting this option allows the user to Select, Create, Import or Delete Profiles.

Profiles can be created on the tool via the Create Profile option or loaded from a PC using the Import Profiles option.

The tool can save up to 30 different Profiles.



PROFILE IDENTIFIER (PID)

A Profile Identifier (PID) is a label or name assigned by the user to identify a specific Profile. This is often a name that can be quickly remembered by the technician. The PID is an alphanumeric string of up to 8 characters; allowable characters include: 0 to 9, _ and A to Z.

Examples of feasible Profile Identifiers:

- 1, 2, 3, ..., 30 (numeric)
- A, B, C, ..., Z (alpha characters)
- PROF01, PROF02, ..., PROF30 (alpha numeric)
- FLANGE01, FLANGE01, ..., FLANGE01 (alpha numeric).

PROFILE TYPE (PTYPE)

The tool recognizes a 3-letter "Profile Type" designation associated with each major bolting function. There are currently five defined bolting functions and Profile Types as described in the table below. Note that different bolting parameters are required for different bolting functions.

BOLTING FUNCTION	PROFILE TYPE (PTYPE)	PARAMETERS
TORQUE	TAR	Torque Angle, Release and Fastener
SNUG	SRF	Snug Torque, Angle, Release and Fastener
TURN-ANGLE	RAR	Angle, Release, Fastener and Speed
TORQUE CHECK	TCK	Torque, Release and Fastener
ROTATIONS	ROT	Release, Torque Limit, Fastener and Number of Rotations

PROFILES CSV FILES

A Comma Separated Values (CSV) file - "PROFILES.CSV" - should contain one profile on each line. The profile data structure includes a profile identifier (PID), a profile type (PTYPE) and a set of tool parameters defined for the particular bolting function. Parameters not needed are set to zero.

Each line should contain a set of comma-separated values arranged as follows:

PID1, PTYPE, Parameter 1, Parameter 2, Parameter 3, Parameter 4

PID2, PTYPE, Parameter 1, Parameter 2, Parameter 3, Parameter 4

...

PID30, PTYPE, Parameter 1, Parameter 2, Parameter 3, Parameter 4

Note that the CSV file format does not specify units. The file format assumes the values are created with the working knowledge of the application units set in the tool which can be adjusted in the Settings menu.

CSV EXAMPLES

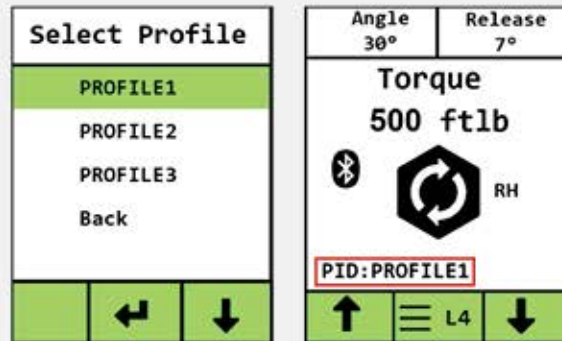
CSV LINE FORMAT EXAMPLES	PARAMETERS
TORQ_500, TAR, 500, 30, 7, RH	PID = TORQ_500, PTYPE = TAR, Torque = 500 ft-lbs, Angle = 30 deg, Release = 7 deg, Fastener = Right Hand
SNUG_075, SRF, 75, 0, 0, HWR	PID = SNUG_075, PTYPE = SRF, Snug = 75 ft-lbs, Angle = 0, Release = 0, Fastener = HYTORC Washer Right Hand
ANGL_120, RAR, 120, 5, RH, NORMAL	PID = ANGL_120, PTYPE = RAR, Turn Angle = 120 deg, Release = 5 deg, Fastener = Right Hand, Speed = Normal
CHEK_500, TCK, 450, 5, HWR	PID = CHEK_500, PTYPE = TCK, Torque Check = 450 ft-lbs, Release = 5 deg, Fastener = HYTORC Washer Right Hand
ROTAT_10, ROT, 7, 100, RH, 10	PID = ROTAT_10, ROT, Release = 7 deg, Torque Limit = 100 ft-lbs, Fastener = Right Hand, Rotations = 10

NOTE: If no Profile ID has been selected, all bolting data is assigned the Profile ID "CWP" (Current Working Profile) by default.

SELECT PROFILE

This option allows the user to select from a list of available profiles and install the parameters saved in that profile.

The Profile ID (PID) is displayed in alternating intervals in the same position as the JID.



CREATE PROFILE ON THE TOOL

A Profile ID can be entered directly via the tool's 3-button user interface.

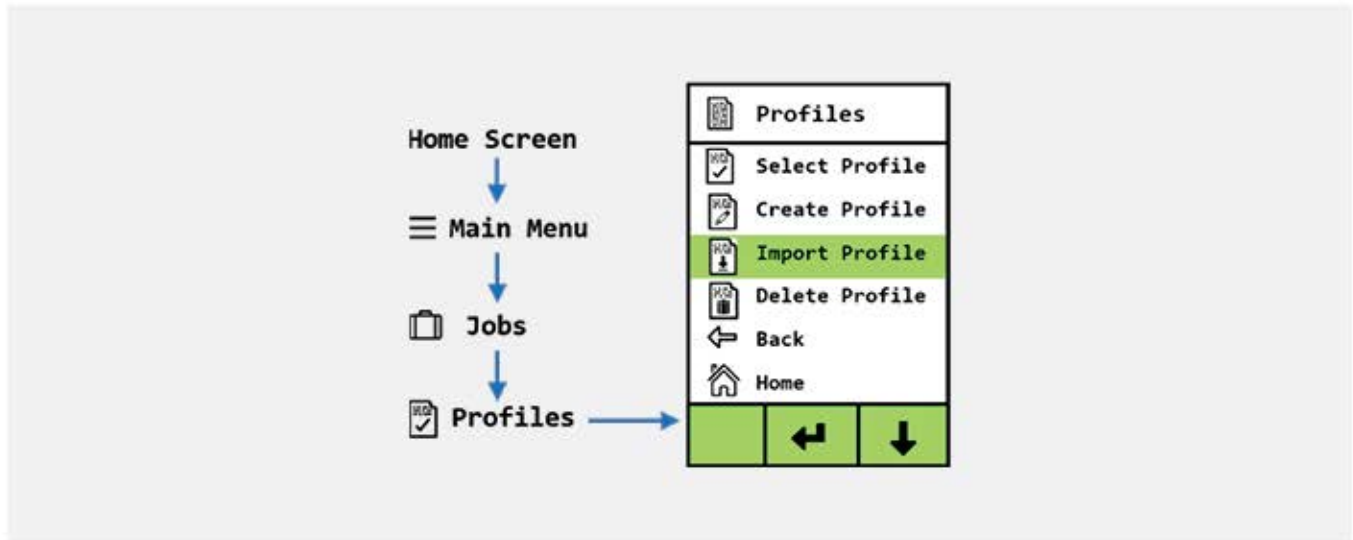
Select Jobs > Profiles > Create Profile and enter the desired profile name with the left and right button. Press the center button again to end and save the Profile ID.

Select a Profile Type and enter the appropriate values for that profile. The profile parameters for a Torque profile named PROFILE1 are shown being entered and accepted below.



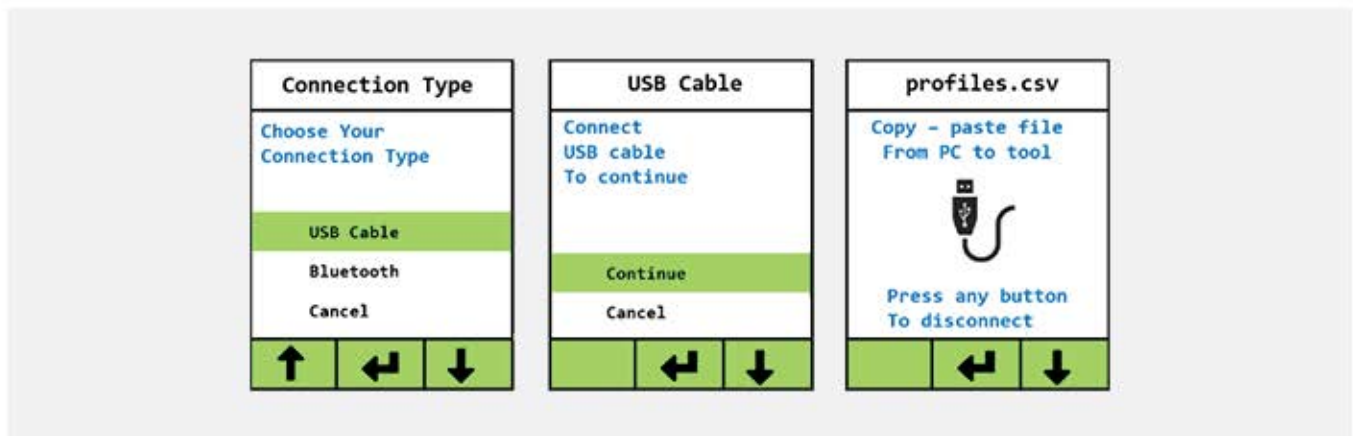
IMPORT PROFILES

The user can import one or more profiles from a PC via either USB cable or Bluetooth Connection. Newly imported profiles will replace existing profiles in the tool. NOTE: If any profile parameter is missing or out of range, the import process may be aborted. Check all profiles after import.



IMPORT PROFILES - USB CONNECTION

Select Import Profile > USB Cable. Once the USB cable is connected, the file PROFILES.CSV can be copied to the "HYTORC" drive on the PC. Press Continue on the tool to complete Import.



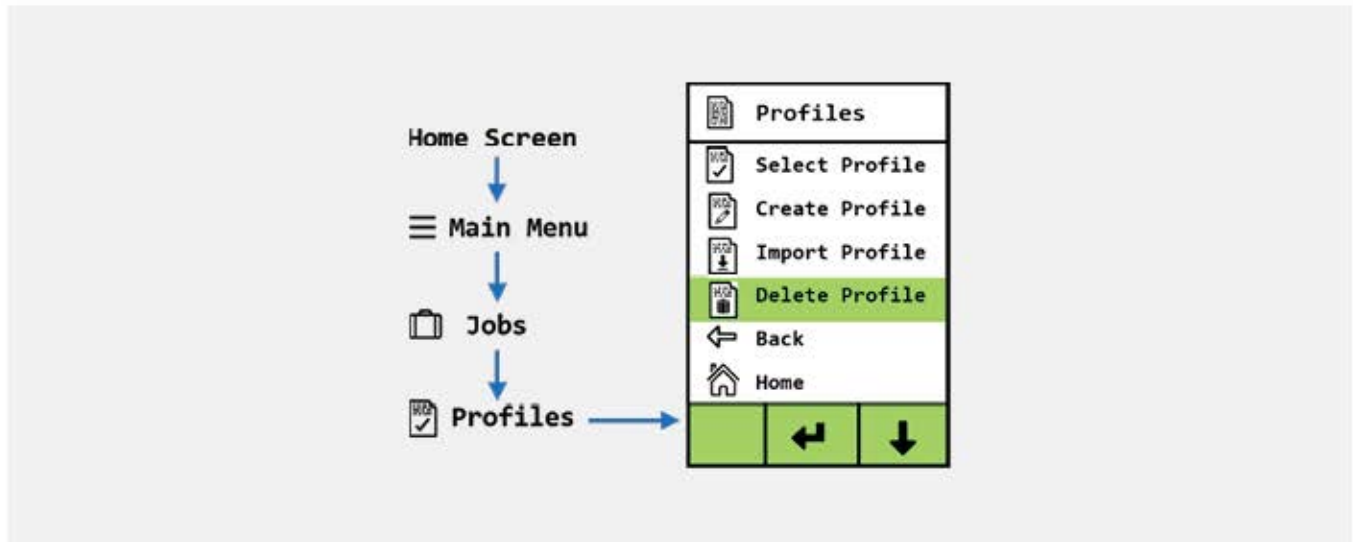
IMPORT PROFILES - BLUETOOTH WIRELESS

The user can Import Profiles via Bluetooth using the HYTORC Connect App. Follow the instructions provided with the App to connect to the tool and import the desired profiles.

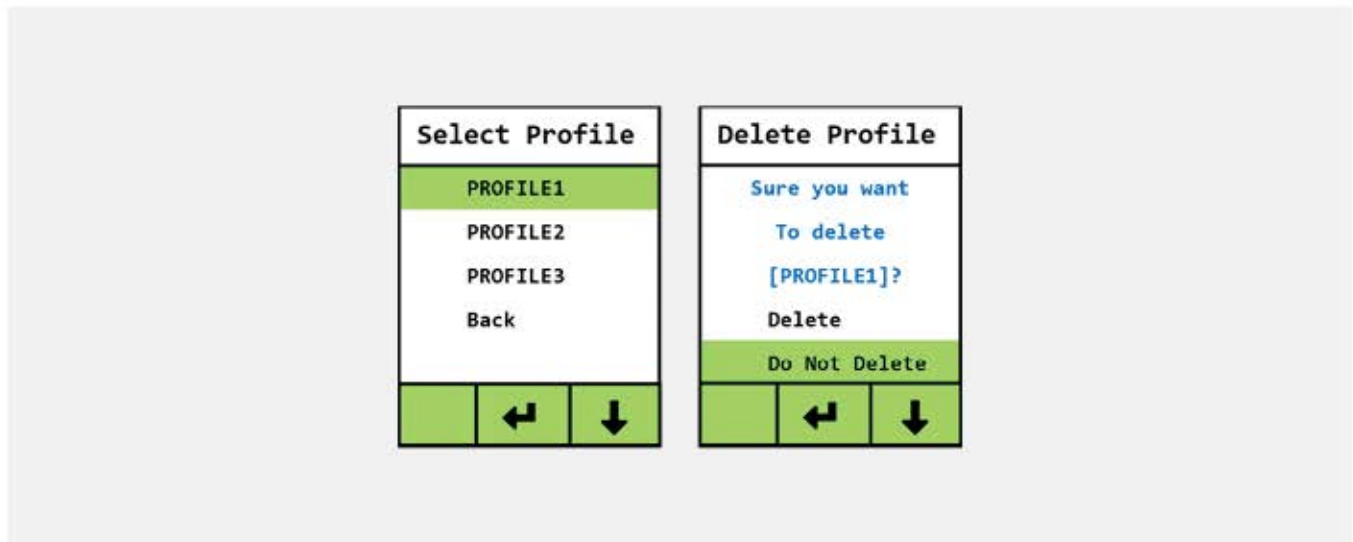


DELETE PROFILES

Profiles may be deleted from the tool by using the Delete Profile option from the Profiles menu.



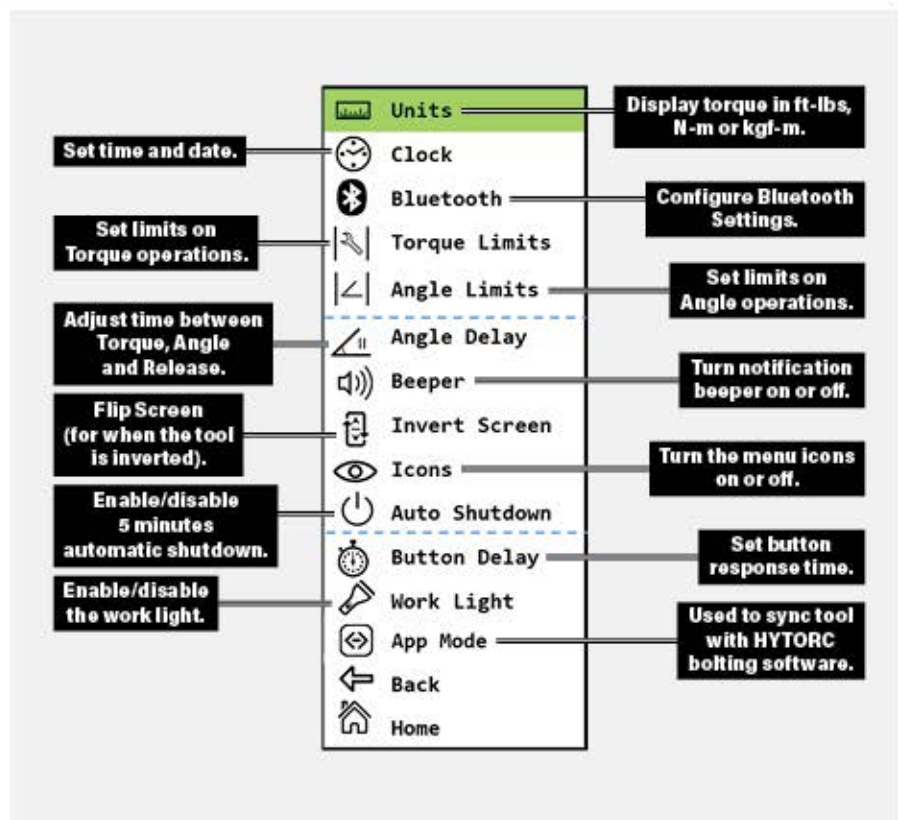
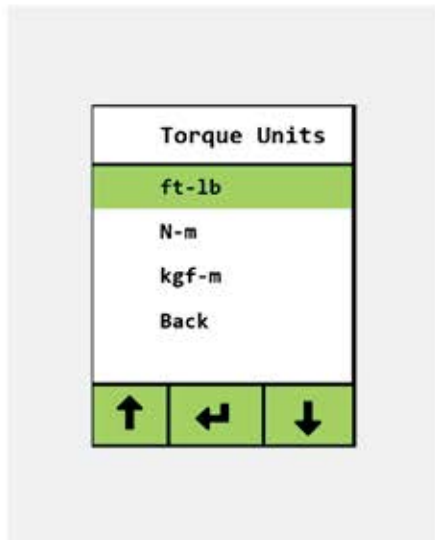
Scroll and select specific profiles to delete from the tool. Scroll and confirm by select Delete to permanently delete the profile from the tool.



The Settings Menu provides options typically used upon initial setup or at the start of a new project. Follow instructions on the screen to select and change the desired settings. All Settings Menu items except Bluetooth and App Mode are available to users at access level L3 (Full User) and above.

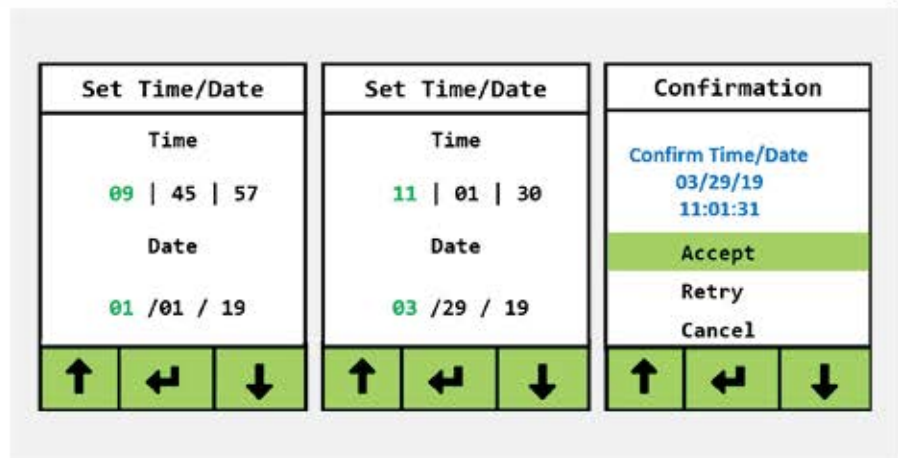
UNITS

The tool can display torque in foot-pounds (ft-lbs), Newton-meters (N-m) or kilogram force meters (kgf-m). The currently selected units are highlighted. Selecting any other units will display all torque values with those selected units.



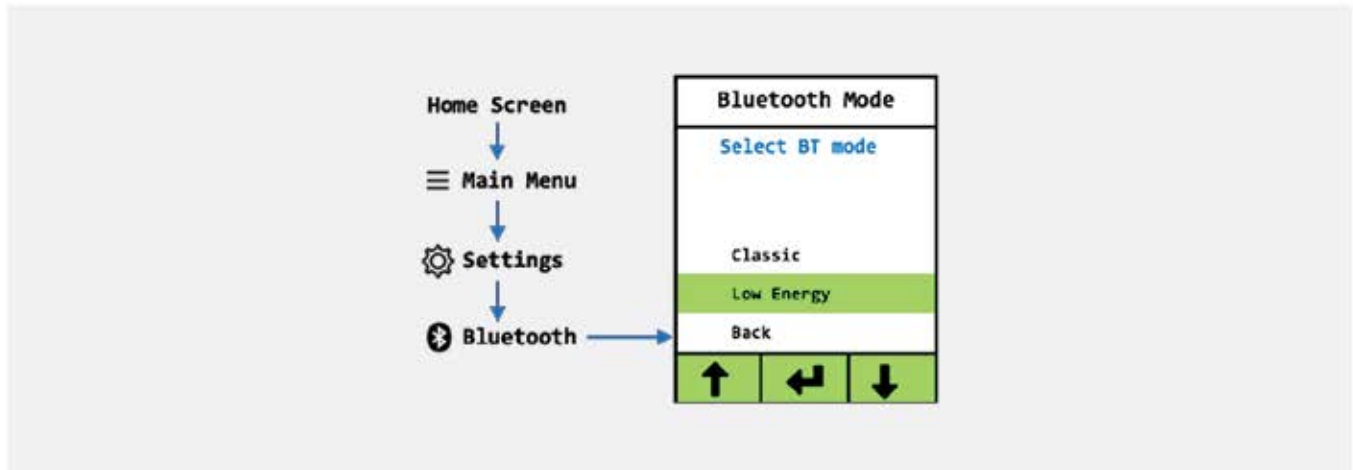
CLOCK

The Clock option allows the user to set time and date. First set the time by using the left and right buttons to increase or decrease the highlighted value. Press the center button to select and move to the next position. Use the same method to enter the date. Once complete the user can either Accept, Retry or Cancel entry.



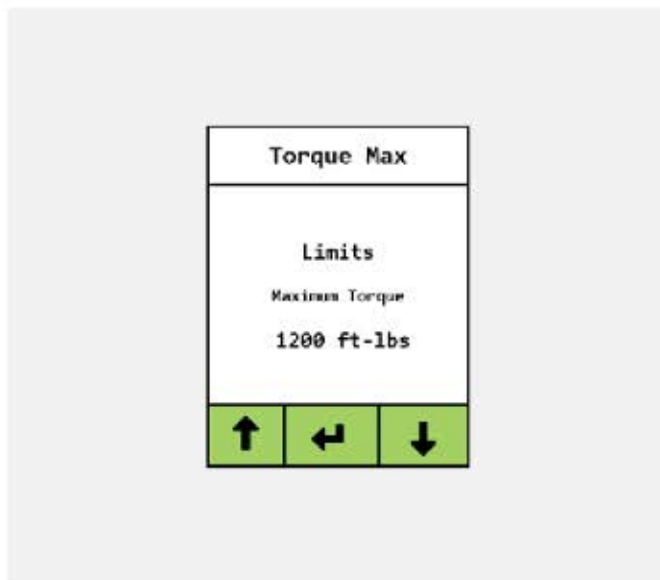
BLUETOOTH

The tool can be set to either Bluetooth Classic mode or to Bluetooth Low Energy mode, to pair with the HYTORC Connect App. A black Bluetooth icon on the Home Screen indicates Bluetooth Classic is active. A blue icon indicates Bluetooth Low Energy is active.



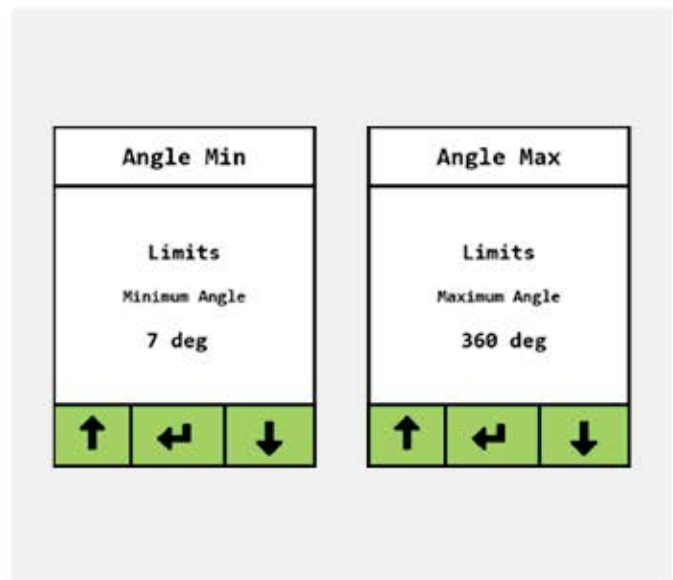
TORQUE LIMITS

The Torque Limits option allows the user to limit the available torque range on the tool.



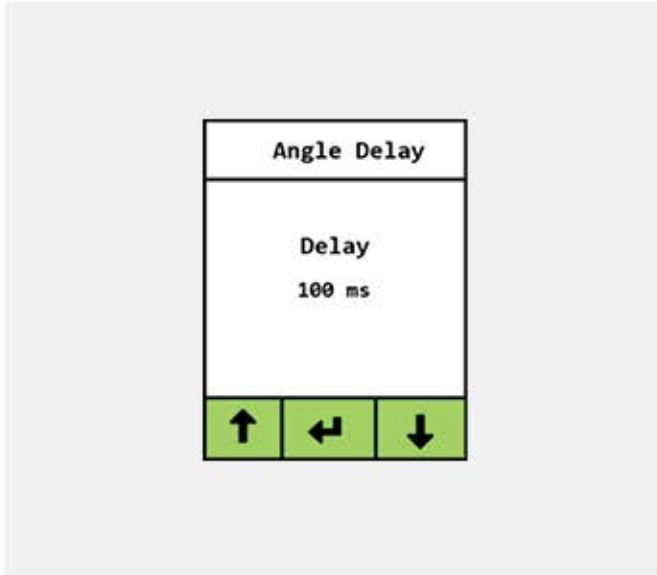
ANGLE LIMITS

The Angle Limits option allows the user to limit Angle operations. The default minimum and maximum Angle limits are 0° and 360°. The user can configure more restrictive limits, as long as they are within that range.



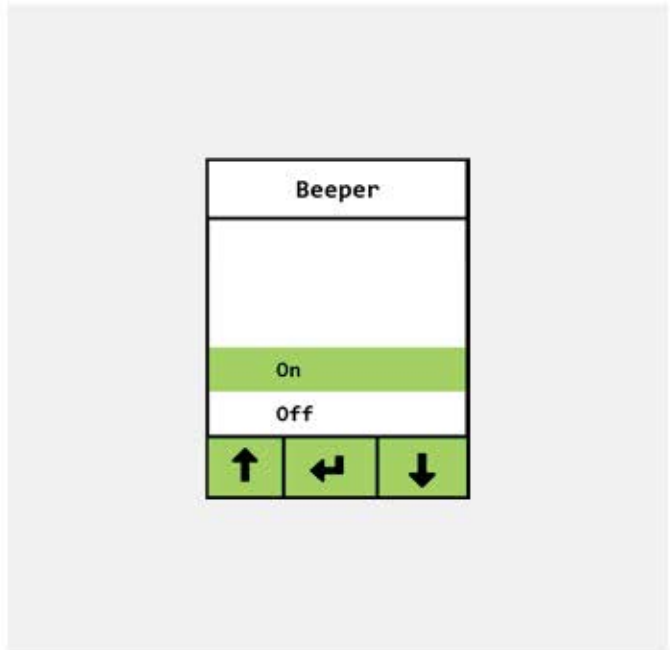
ANGLE DELAY

Time delay between Torque, Angle, and Release in a Torque & Release, Torque & Angle or Angle & Release operation. Users can adjust the angle delay from 0 to 3,000 milliseconds (equivalent to 3 seconds).



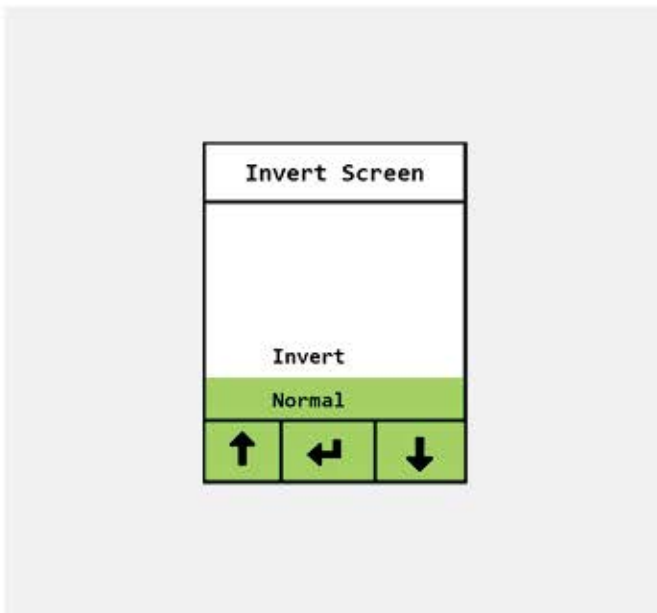
BEEPER

Allows users to turn the beeper on or off. Scroll and select the setting desired.



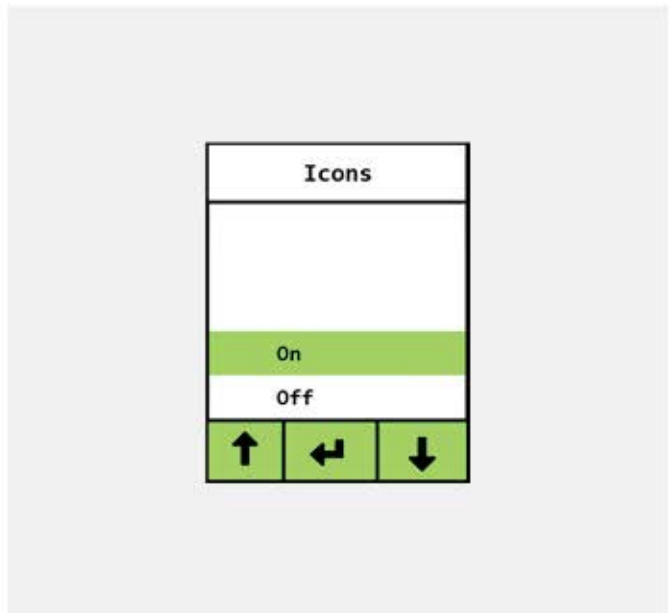
INVERT SCREEN

This allows the users to invert the LCD screen (turn the display upside down). In order to maintain the correct mapping of arrows to buttons, the direction of the arrows are reversed when the screen is inverted.



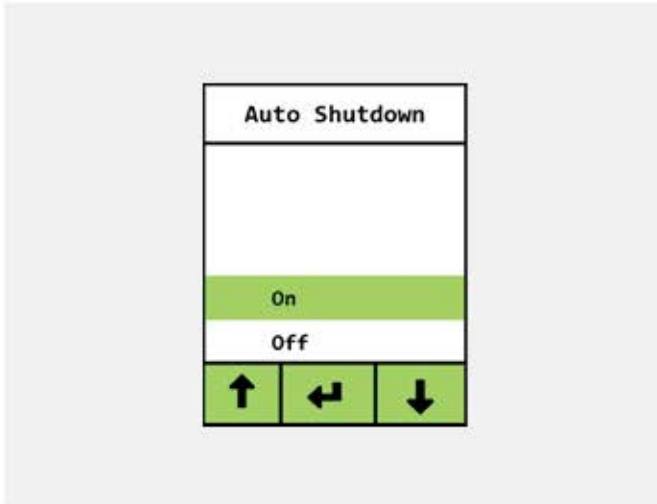
ICONS

This setting allows the user to enable or disable menu icons. When turned on, icons are displayed to the left of the menu options. When turned off, all menu options appear the same except that the icons are not visible.



AUTO SHUTDOWN

The tool will automatically shut down after 5 minutes of inactivity. When Auto Shutdown is set to Off, the tool will stay on continuously until the battery is drained.



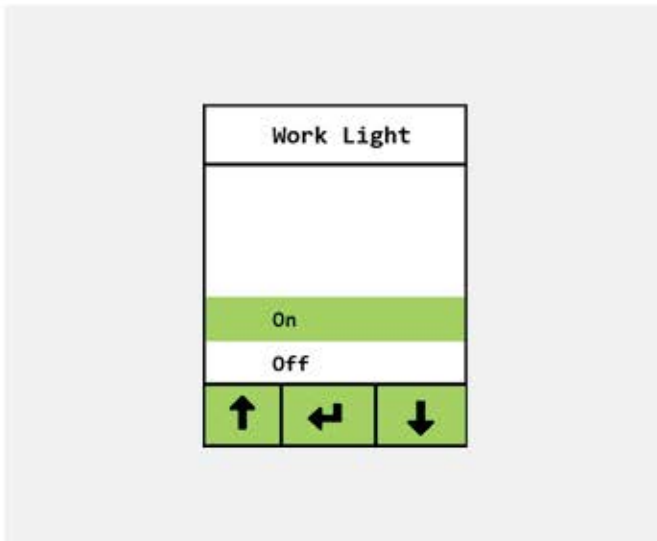
BUTTON DELAY

This option allows the user to adjust button response time from 75 to 500 ms. A higher delay value slows menu scrolling and selection.



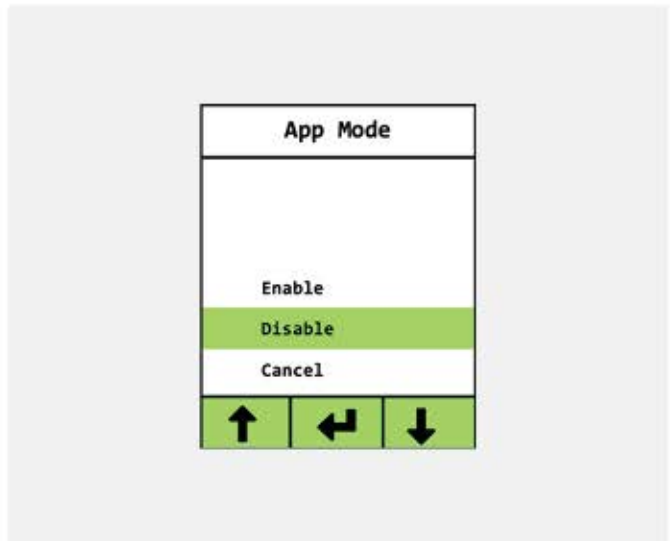
WORKLIGHT

The Worklight is set by default to come on when the trigger is pulled and turn off 5 seconds after release. Select "Off" to deactivate the Worklight.



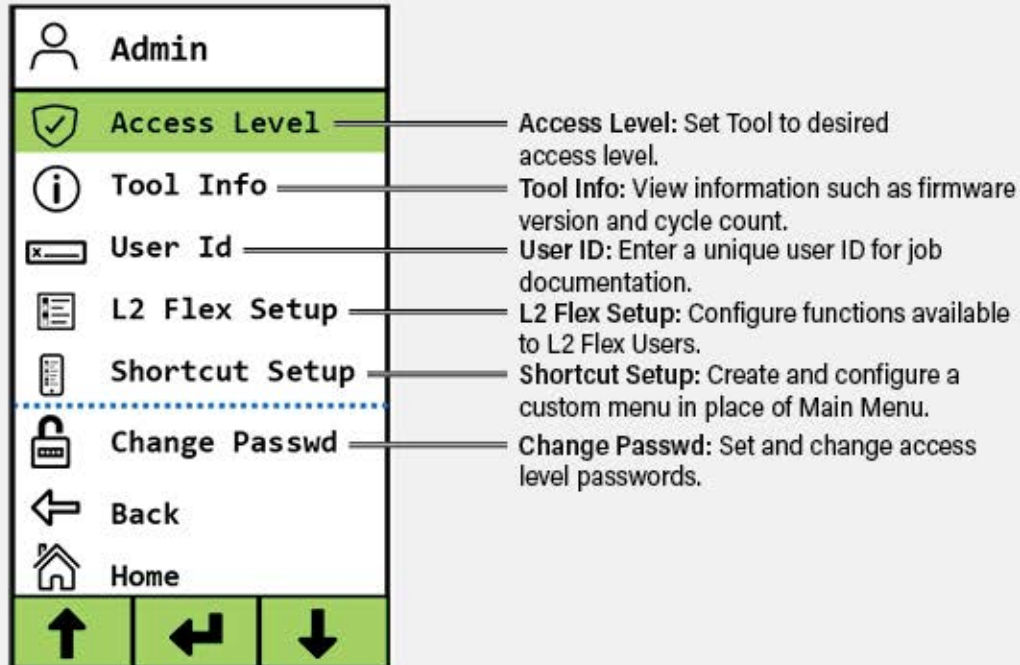
APP MODE

When enabled, can be used to sync the tool with HYTORC bolting software.



The Admin Menu provides options for various administrative functions.

NOTE: Not all menu items are available at all access levels.



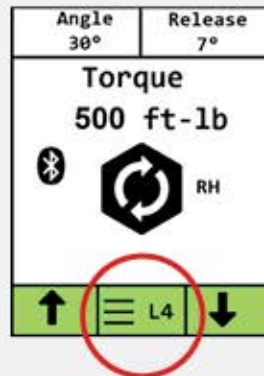
ACCESS LEVELS

The Tool can be set to one of five operating access levels:

L1	LEVEL 1 Jobs User	The Jobs User (L1) has the lowest administrative privilege. The Jobs User has access only to the Basic Bolting options and to menu options that allow them to conduct bolting with preset Jobs. The Jobs User may also export and print Jobs. Default Password: none
L2	LEVEL 2 Flex User	The Flex User level (L2) has access to those Flex User options as configured by the Admin from a list of options. The Flex User may execute preset Jobs or may create and export or print Jobs. Default Password: FLEX
L3	LEVEL 3 FULL User	The Full User (L3) has access to the same functions as an Admin (L4) except the Full User cannot configure Flex Options or set passwords. Default Password: FULL
L4	LEVEL 4 Admin	The Admin (L4) is the highest customer-accessible access level. An Admin-level user is typically the tool owner, supervisor, production manager or storeroom administrator responsible for assigning access to menu options. The L4 Admin is the only user able to configure Flex User options and Shortcut Menu options and to change passwords. Default Password: ADMIN
L5	LEVEL 5 Service Level	An additional access level is provided primarily for HYTORC authorized service personnel for tool setup and maintenance. One Service-level function on the Admin Menu - Tool Calibration - is available to the Admin (L4) access.

The tool is shipped set to the L4 Admin level by default, so that the initial user has the ability to set up security passwords.

The current Access Level of the tool is always displayed on the Home Screen in the center box at the bottom of the screen.



ACCESS LEVEL OPTION/FUNCTIONS

The tool can operate at any of five levels, each level having access to different privileges and functions as outlined in the table below.

OPTION/FUNCTION	L4	L3	L2	L1
MAIN MENU				
Torque	✓	✓	C	
Snug	✓	✓	C	
Angle	✓	✓	C	
Release	✓	✓	C	
Fastener	✓	✓	C	
Advanced Bolting	✓	✓		
Jobs	✓	✓	✓	✓
Settings	✓	✓		
Admin	✓	✓	✓	✓
Service	✓			
ADVANCED BOLTING				
Turn Angle	✓	✓	C	
Torque Check	✓	✓	C	
Rotations	✓	✓	C	
JOBS				
Start Job	✓	✓	✓	✓
End Job	✓	✓	✓	✓
Create Job ID	✓	✓	✓	✓
Import Job ID(s)	✓	✓		
Export Job	✓	✓	✓	✓
Delete Job	✓	✓		
Select Profile	✓	✓	✓	✓
Create Profile	✓	✓		
Import Profiles	✓	✓		
Delete Profiles	✓	✓		

(Continued on the following page.)

LEGEND

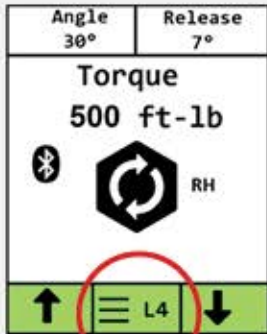
- ✓ Level has access
- C Function may be made available to the level at the discretion of the Admin

OPTION/FUNCTION	L4	L3	L2	L1
SETTINGS				
Units	✓	✓		
Clock	✓	✓		
Bluetooth®	✓			
Torque Limits	✓	✓		
Angle Limits	✓	✓		
Angle Delay	✓	✓		
Beeper	✓	✓		
Invert Screen	✓	✓		
Icons	✓	✓		
Auto Shutdown	✓	✓		
Button Delay	✓	✓		
App Mode	✓			
ADMIN				
Access Level	✓	✓	✓	✓
L2 Flex Options	✓			
Shortcut Options	✓			
Change Password	✓			
Tool Info	✓	✓	✓	✓
Regulatory Info	✓			
User ID	✓	✓	✓	✓
SERVICE				
Calibrate Tool	✓			

LEGEND

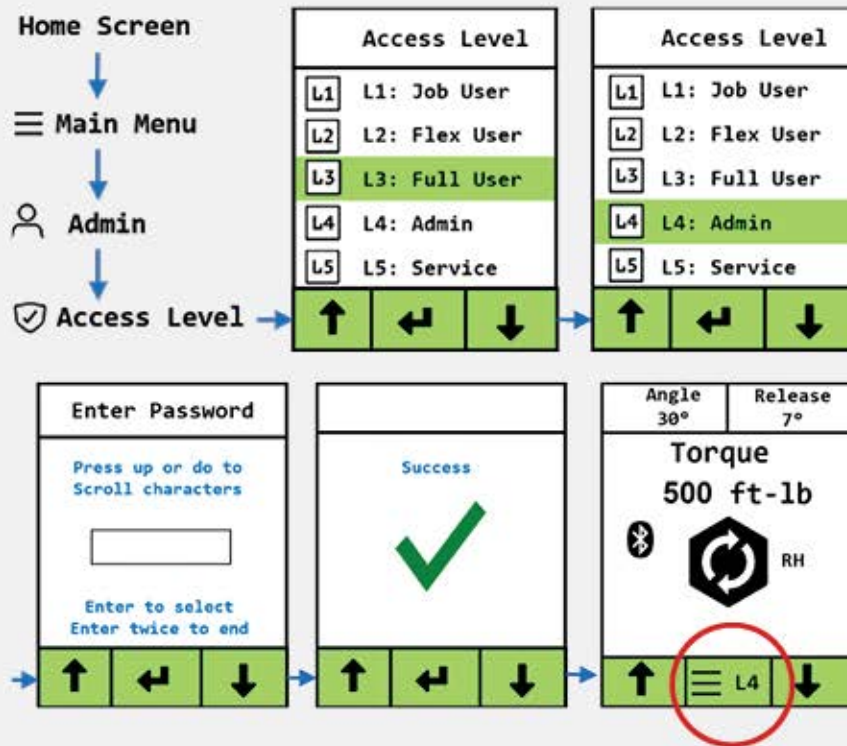
- ✓ Level has access
- C Function may be made available to the level at the discretion of the Admin

SET ACCESS LEVEL



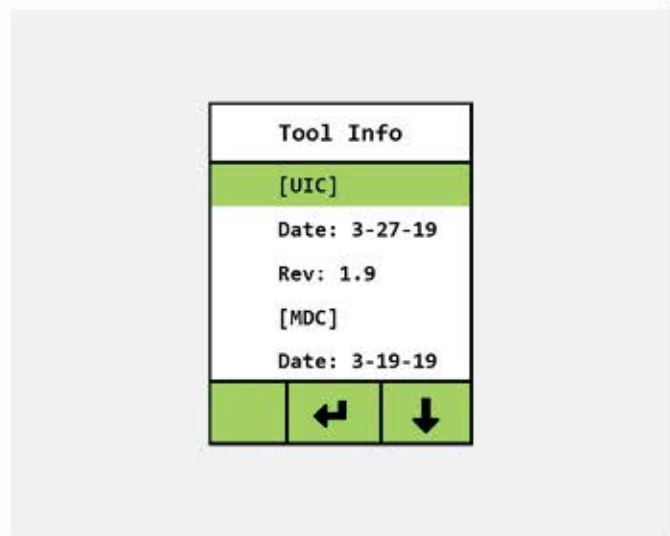
To switch the tool to a lower level select Admin > Access Level. Scroll to the level desired and press the center button to select. The new Access Level is now displayed in the center box at the bottom of the screen. A password is not required to switch from a higher level to a lower level.

Users can switch to a higher level by entering a password for the desired level. All passwords are set at the Admin level.



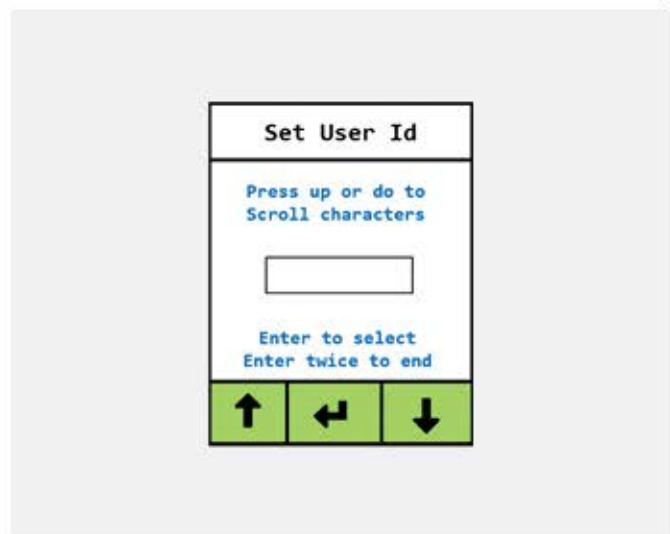
TOOL INFO

The Tool Info option provides the user with useful tool information, in particular the versions of firmware and other information including cycle count and last calibration date. The user can scroll down to display more information.



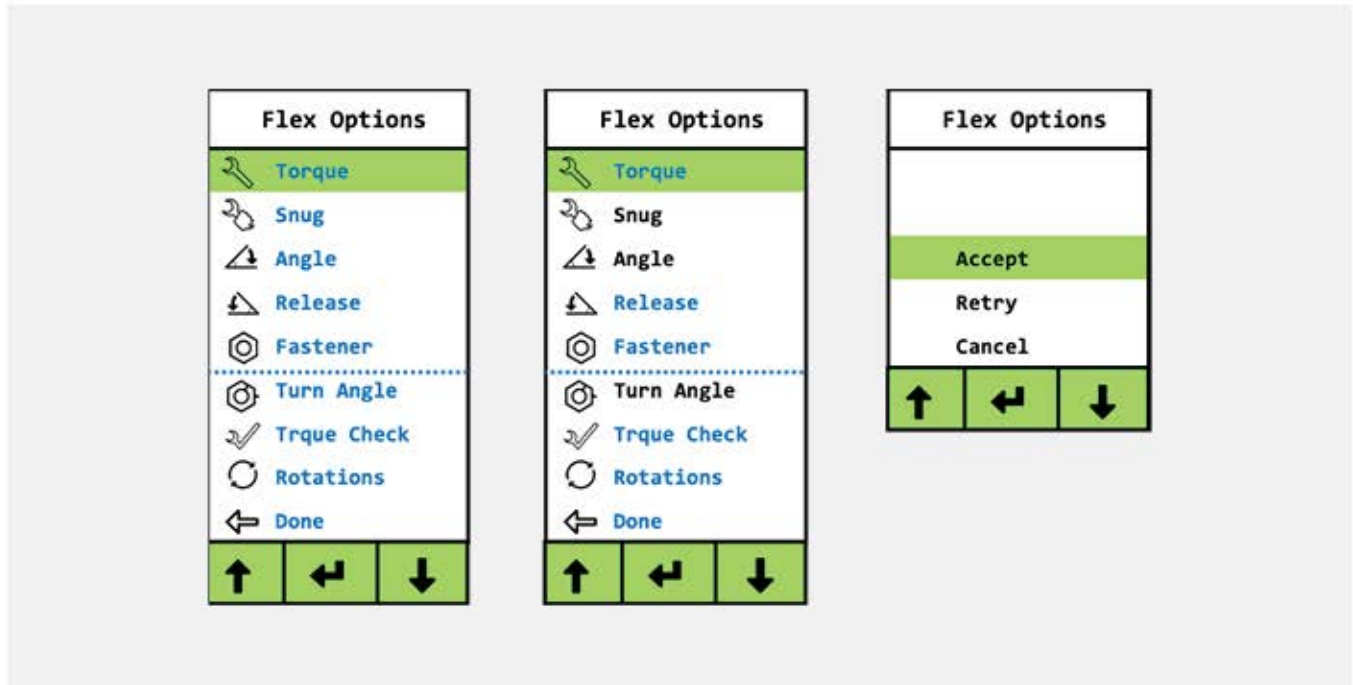
USER ID

The User ID function allows a user at any access level to enter their own unique ID for purpose of traceability of the event record. The User ID is an alphanumeric string of up to 8 characters. Users can access this function again to clear their User ID. User ID does not appear on the display, but is written into the User ID field of each data record.



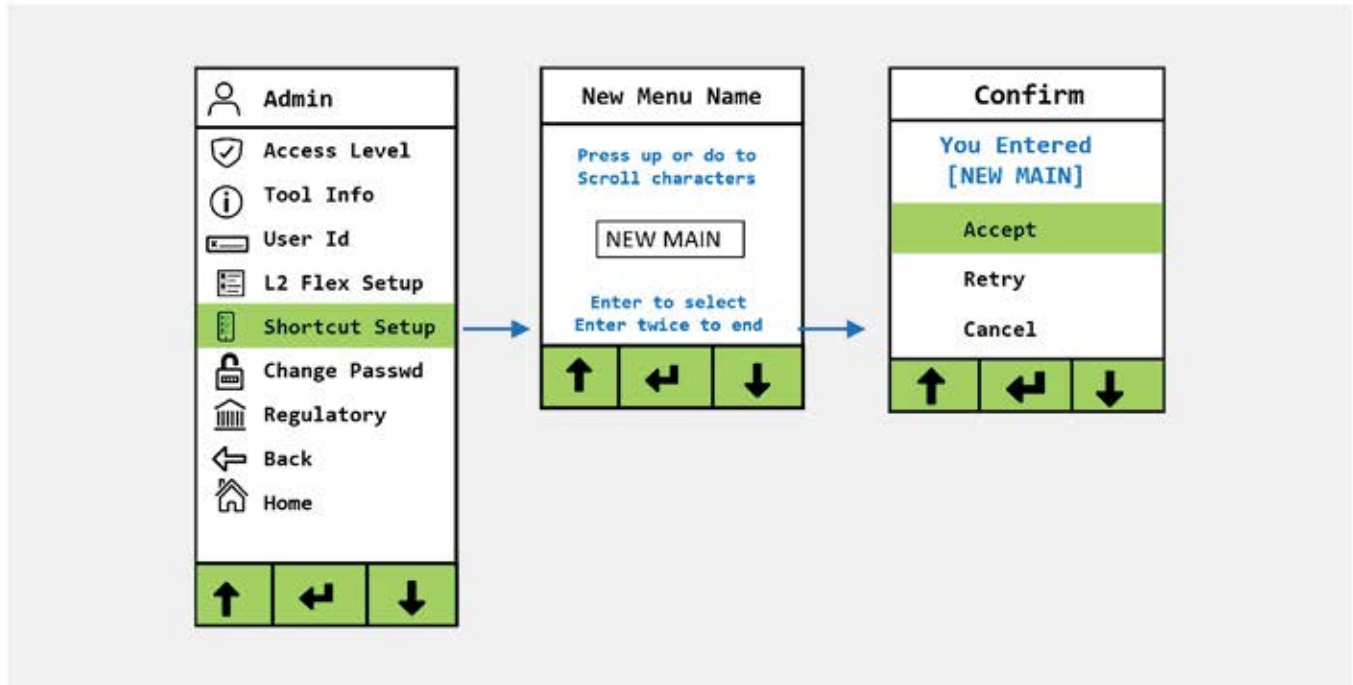
L2 FLEX SETUP

The L2 Flex Setup menu option allows the Admin to configure bolting options for and make certain functions unavailable to the L2 Flex User. The functions in Blue on the selection menu are available by default. Once the Admin selects an option to remove, the option turns black and will not be available to the Flex user.

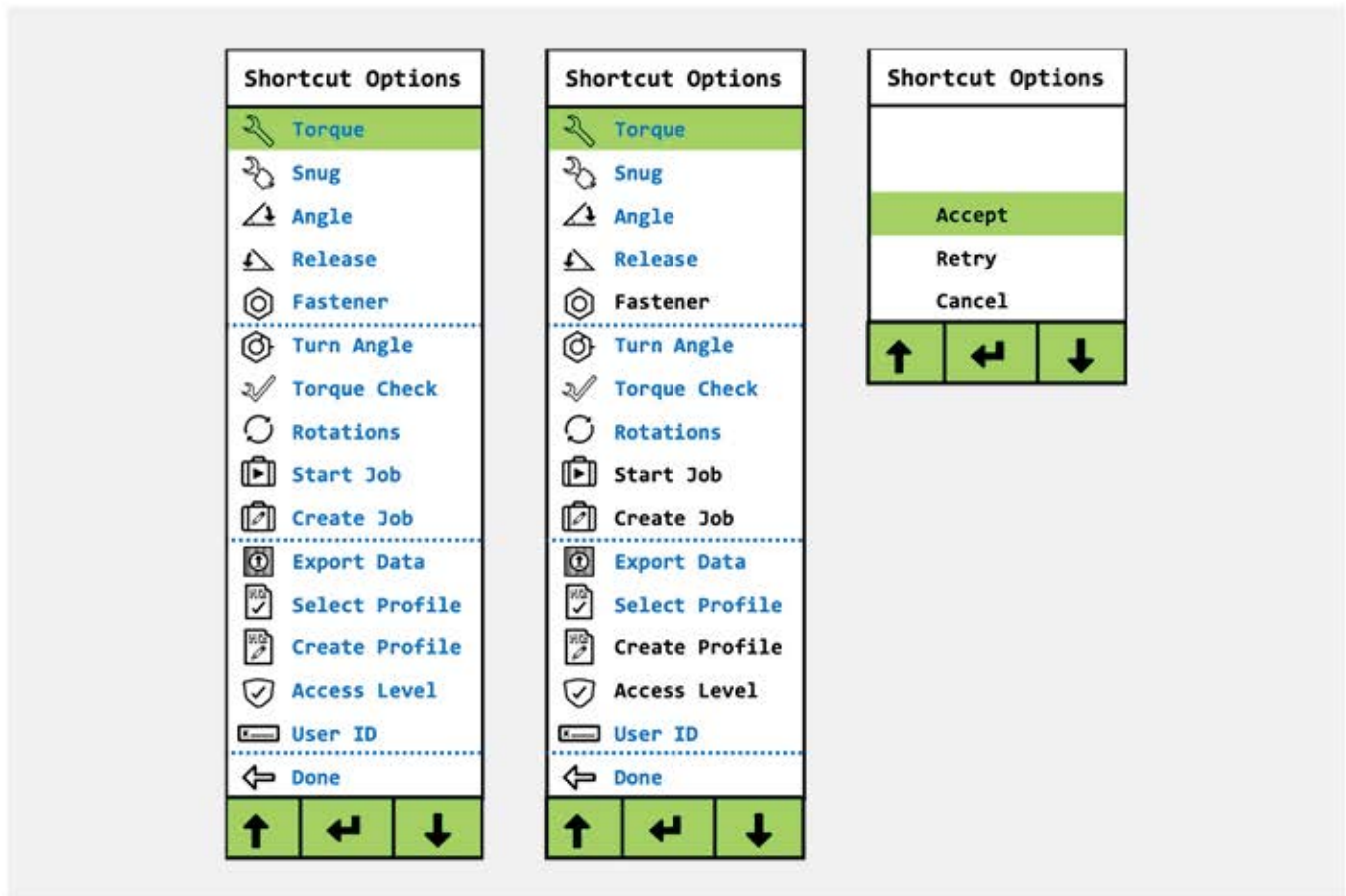


SHORTCUT SETUP

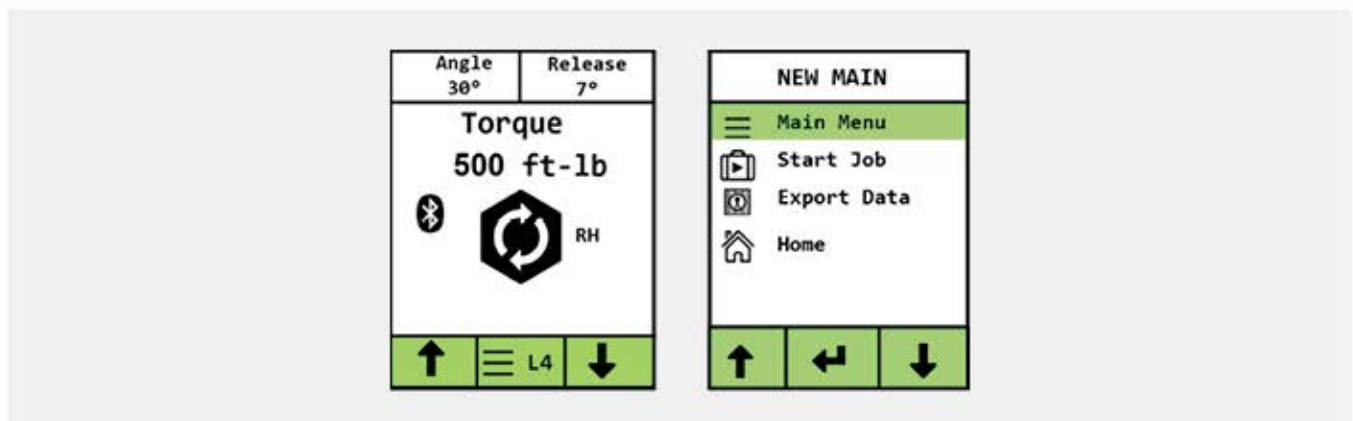
The Admin can create a custom primary menu that takes the place of the main menu. The Admin is asked to create a name up to 10 characters for the custom menu such as "NEW MAIN." The Admin confirms the new name and moves on to select options that will appear on the custom menu.



Scroll through the options and use the center button to select options to leave off the shortcuts menu. The options selected change color from blue to black. Only the options in blue will appear on the shortcut menu. Once the NEW MENU is accepted it will appear as the primary menu in the place of the main menu.

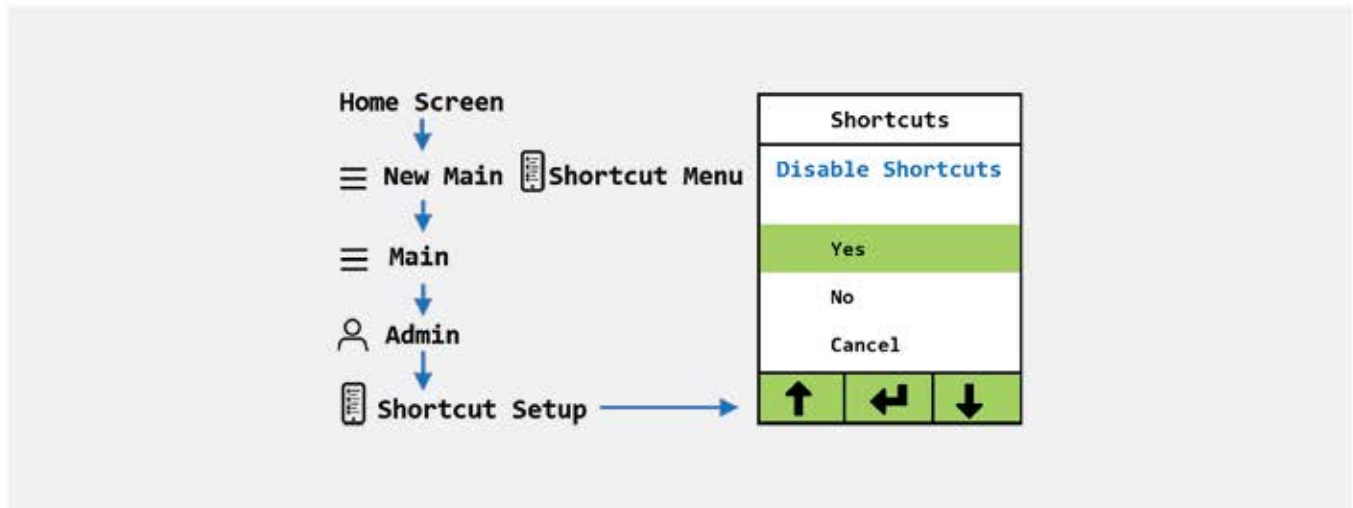


After the Shortcut Menu has been configured it now appears in place of the Main Menu. The Shortcut Menu always has the standard Main Menu as the first option so the user can quickly to navigate to any menu or submenu on the tool. The advantage of the Shortcut menu is that only the options needed by the operator are displayed. For instance, an application may require that an operator only have access to a few menu options such as Start Job or Export Data. These options are now just one button push away.



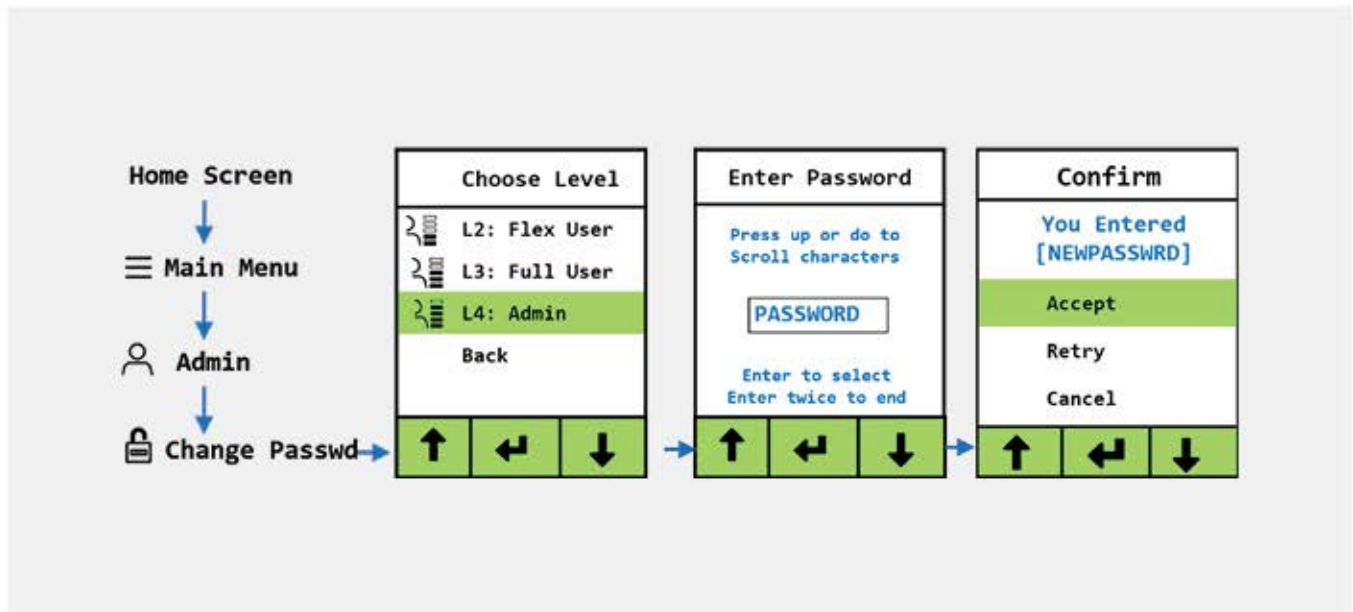
SHORTCUT SETUP (CONT'D.)

At any time the user can remove the shortcuts menu and return to the standard main menu. Admin > Shortcut Setup > Yes to Disable Shortcuts.



CHANGE PASSWORD

The Change Passwd option allows an L5 or L4 user to change the password for their level and for each lower access level. Passwords can be up to 8 characters in length with allowable characters: 0 to 9, _, and A to Z.



ERROR MESSAGES

MESSAGE	DEFINITION	IMPACT	ACTION
EARLY TRIGGER RELEASE RETRY OPERATION	Trigger released before operation complete	None	Repeat operation
LOW BATTERY RE-CHARGE OR CHANGE NOW	Battery is depleted	None	Re-charge or switch battery
OPERATION STOPPED RETRY	Tool has exceeded maximum safe torque during either an angle or torquing operation.	Potential damage to tool	Reduce angle or torque target
SUCCESS! OK TO RELEASE TRIGGER	Operation completed correctly	None	None
TIMEOUT TRY AGAIN	Trigger held longer than necessary to complete operation	None	Release trigger and repeat operation
TIMEOUT WAITING FOR TRIGGER RELEASE	Trigger held longer than necessary to complete operation	None	Release trigger and repeat operation
TRIGGER RELEASE	User did not release trigger after completion of operation	None	Release trigger and select the exit option
UNCALIBRATED TOOL	Tool not calibrated	Inaccurate bolting	Calibrate tool

JOB DATA "RESULT" CODES

CODE	DEFINITION
OK	OK/Success
ETR	Early Trigger Release
MHS	Motor Has Stalled
BTS	Below Target Speed
LBV	Low Battery Voltage
MOC	Motor Over Current
OT	Temperature Exceeded
ME	General Motor Error

ACCESS LEVELS	5, 41-43, 44, 55
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