TL-RTS-UIM
Edition 1
July 2024

RTS Connect Series

User Manual

Save These Instructions

Ingersoll Rand

EN

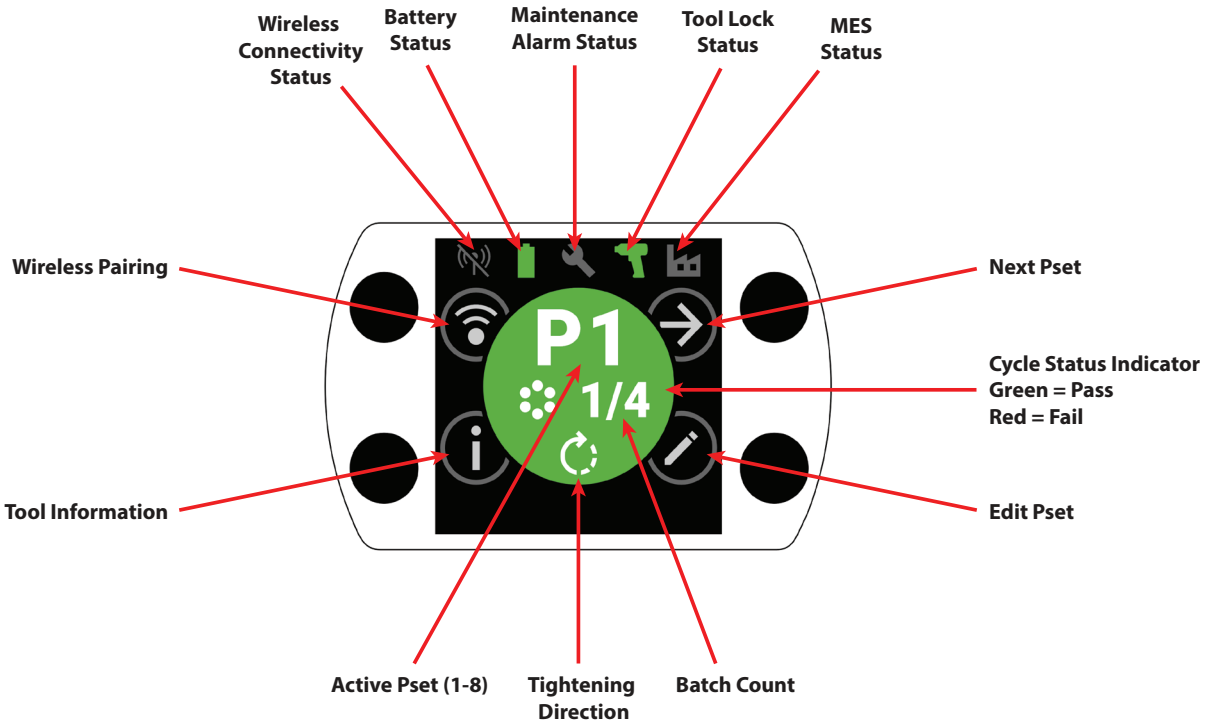
Intended Use:

This manual provides instructions for programming the parameters of the RTS Connect Series Mechanical Pulse Tools.

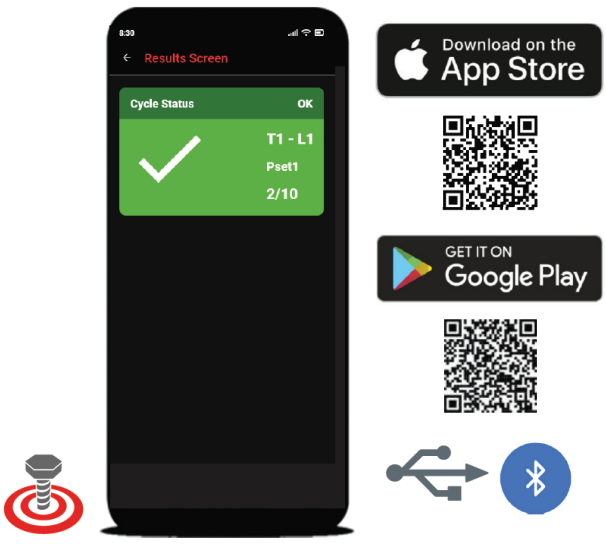
Programming Methods

- Program via Tool User Interface and Display.
- Program via Bluetooth with Android or iOS INSIGHT Connect mobile application.
- Program via Wi-Fi or Radio with INSIGHTqcx Controller.
- Program via USB-C with INSIGHT Connect mobile or desktop application.

Tool User Interface Identification



Button Identification	
Symbol	**Function**
	Next Pset
	Edit
	Information
	Wireless Pairing
	Next Line/Next Page
	Increase
	Decrease
	Accept
	Cancel/Disconnect
	Back



1. Symbol Identification

PSet Symbol Identification			
Symbol	**Function**	**Symbol**	**Function**
	Tightening Direction		Flush Level
	Batch Count		Full Power Mode
	Torque Level		

Wireless Symbol Identification			
Symbol	**Function**	**Symbol**	**Function**
	Bluetooth Connected		Radio Paired, Disconnected
	Bluetooth Paired, Disconnected		Wi-Fi Connected
	Bluetooth Searching		Wi-Fi Paired, Disconnected
	Radio Connected		Wireless Disconnected, Not Paired

Cycle Feedback / Lock Symbol Identification			
Symbol	**Function**	**Symbol**	**Function**
	Early Trigger Release		Maintenance Alarm Lock
	Rehit Detected		Wireless Lock
	Reverse Disabled		Barcode Lock
	Job Not Selected		Socket Lock
	Controller Lock		

Status Bar Symbol Identification			
Symbol	**Function**	**Symbol**	**Function**
	Maintenance OFF		Battery OK
	Maintenance OK		Battery Low
	Maintenance Warning		Battery Critically Low
	Maintenance Alert		MES Disabled
	Tool Unlocked		MES Connected
	Tool Locked		MES Enabled, Disconnected

2. Color LCD Display

The color LCD display on the tool allows for quick setup and tool feedback. A full list of display icons can be seen in the "Symbol Identification" section of this manual on page EN-2 and EN-3.

Cycle feedback is provided with the round center section of the home screen, displaying Green for a successful tightening, and Red for a failed cycle.

If desired, the LCD display can be disabled in the "Interface Setup" section of the INSIGHT Connect mobile application, or using the INSIGHTqcx Controller.

2.1 Multi-color 360° Status Beam

The 360° LED light ring on the front of the tool functions both as a headlight (white color) and as a cycle status indicator, turning Green for a successfully completed tightening, or Red for a failed cycle.

LED Status Beam brightness and timeout can be adjusted using the INSIGHT Connect application (Interface Setup section), or the INSIGHTqcx Controller.

2.1.1 Default Setting

The white headlight will turn OFF after 15 seconds of inactivity. Green or Red cycle result will remain illuminated for three seconds after a completed cycle before returning to the white headlight color.

2.2 Keypad

The keypad with four multi-function buttons allows simple navigation of the tool display.

If desired, the keypad can be disabled in the "Interface Setup" section of the INSIGHT Connect mobile application, or using the INSIGHTqcx Controller.

3. Navigating Home Screen

3.1 Wireless Pairing Screen

1. Select the ⦾ button to enter the pairing screen.
2. Use the ⮌ button to switch between the available wireless options (Bluetooth, Radio, and Wi-Fi).
3. Use the ✓ button to select an option.

3.2 Tool Information Screen

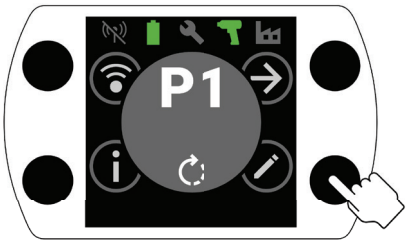
1. Select the ⓘ button to enter the Tool Information screen.
2. Use the ⮌ button to cycle through tool Model number and Serial number, FCC ID, IC ID, Firmware version, Cycle Count, Clock, etc.
3. Use the ✓ button to return to the home screen.

3.3 Next Pset Button

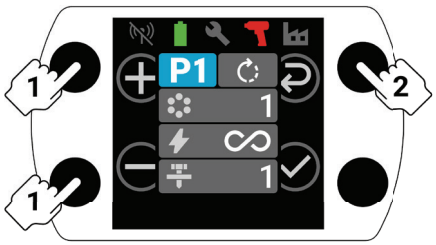
1. Use the → button to cycle through the eight Psets stored on any RTS Connect series tool.

3.3.1 Edit Pset

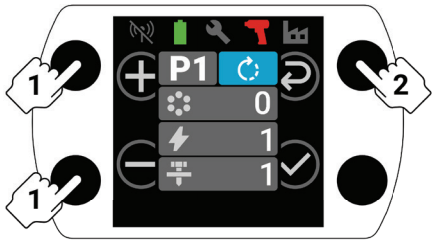
1. Select the ✎ button. Enter the default password '0000' if prompted.

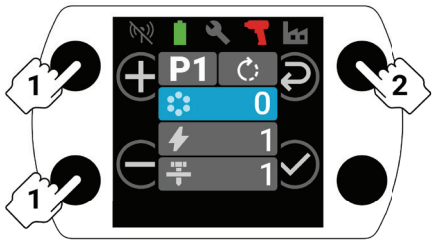


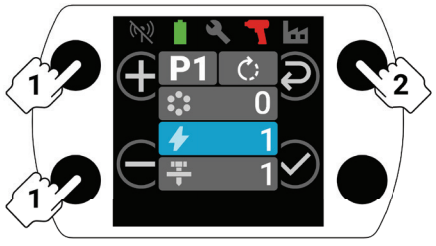
2. Use the ⊕ and ⊖ buttons to select the Pset to be edited. Use the ⮌ button to move to the next field.

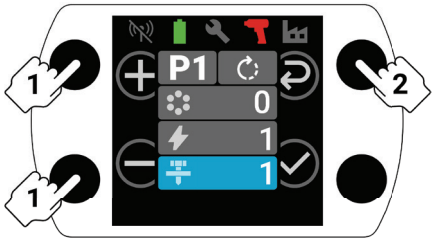


3. Next, adjust Direction of Rotation ( ), Batch Count ( ), Torque Level ( ), and Flush Level ( ) in the same manner as Step 2.
   a. Refer to "RTS Setup Procedure" on page EN-9 for detailed instructions on how to set the correct Flush Level and Torque Level.







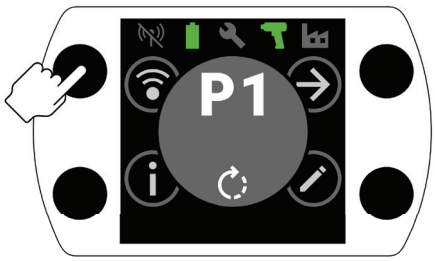


4. Select the ✓ button at any point during the setup process to save the Pset and return to the home screen.

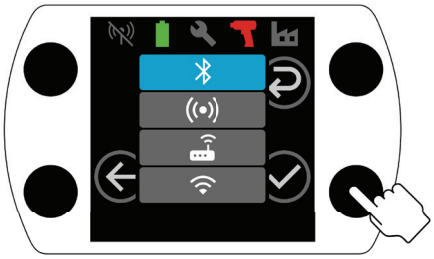
4. INSIGHT Connect Bluetooth Pairing

Note: Record the serial number of the tool to be paired before beginning the pairing process.

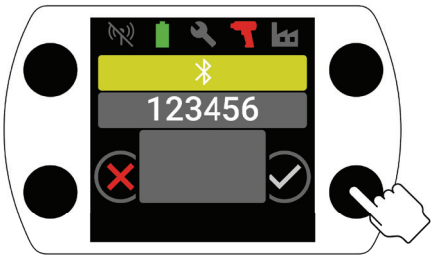
1. Select the button for wireless pairing from the home screen on the tool. Enter the default password '0000' if prompted.



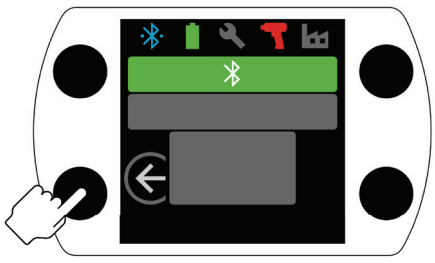
2. Press the button with the Bluetooth icon highlighted to accept.



3. Select "Connect to the Tool", and then select "Available Tools" in the INSIGHT Connect mobile application.
4. Select the serial number of the tool you wish to pair, and follow the in-app prompts.
5. Select the button on the tool when prompted, if the code on the tool display matches the code shown in the application.



6. Pairing is now complete, select the button to return to the home screen.

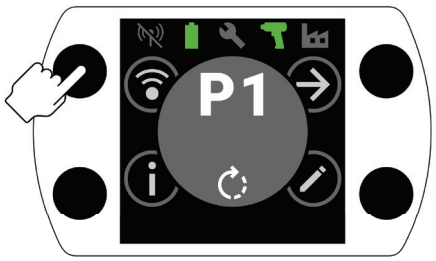


5. INSIGHT Connect USB Connection

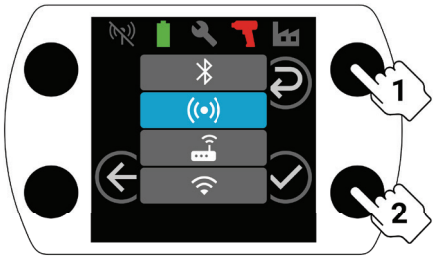
1. Install the battery in the tool and connect the tool to a PC or Android mobile device using a USB-C cable.
2. Select "Connect to the Tool" in INSIGHT Connect mobile or PC application.
3. Select "USB" if prompted.
4. Follow prompts on PC or Android device to complete connection.

6. Pairing with INSIGHTqcx Controller

1. Select the button for wireless pairing from the home screen on the tool. Enter the default password '0000' if prompted.



2. Select the button to highlight the Radio icon ( ) and press to accept.



3. Select the "Wireless Tools" in the Controller.
4. Select the "Pair" button.
5. The Controller will pair with the tool.

7. Pset Settings and Advanced Features

Parameter	Description	Setting Options	Adjustable with
Counter Clockwise	Change the Pset tightening direction to counterclockwise and the loosening direction to clockwise.	ON/OFF	Tool, Application, and Controller
Reverse Disable	The tool only operates in the tightening direction. This setting allows for greater process control and eliminates the possibility of operators mistakenly loosening a fastener.		Application and Controller
Full Power Mode	Removes all tightening and process controls from the "Forward" direction. Tool will run as long as the trigger is actuated.		
Torque Level	Adjust the torque output of the tool. No specific torque value is assigned to a specific Torque Level. The tightening must be audited on the application during the setup process. Refer to the Torque Estimator in the INSIGHT Connect application for guidance on Torque Level. Refer to "RTS Setup Procedure" on page EN-9.	T1-T40	Tool, Application, and Controller
Flush Level	Used to adjust tool sensitivity for detecting snug point. L1 will be the least discerning (least strict criteria must be met), L7 will be the most discerning (strictest criteria must be met). Higher Flush Levels will be necessary for applications with higher prevailing torque. Refer to "RTS Setup Procedure" on page EN-9 for detailed instructions on selecting a Flush Level.	L1-L7	

Parameter	Description	Setting Options	Adjustable with
Batch Count	Used to track the completion of a group of fasteners.	0-99	Tool, Application, and Controller
Snug Detection Delay	The tool will delay flush detection at the beginning of a cycle for a specified period of time. If there are loads on a fastener before it is fully seated, the flush detection algorithm may enable prematurely. When it is known that flush detection is not to occur until after a specific period of time, setting the Flush Detection Delay to that time will disable flush detection until the time has elapsed. Best used when a consistent snug point cannot be achieved purely by adjusting Flush Level as described in the "RTS Setup Procedure" on page EN-9.	0-3.0, in 0.1 second increments	Application and Controller
Rehit Detection	When the tool detects a high load on a fastener at startup, Rehit Detection Mode immediately shuts OFF the tool and displays a cycle-fail indicator, alerting the operator that a fastener was previously tightened or has been cross-threaded.	ON/OFF	
Cross Thread Reduction	The tool will turn two revolutions in the loosening direction prior to tightening a fastener to ensure better thread alignment.		
Rehit Prevention	Rehit Prevention mode disables the tool trigger for a specified duration following the completion of each cycle to help prevent accidental rehit mistakes in applications where operators rapidly move through a sequence of fasteners.	0, 0.5, 1, 2, 3 seconds	
One Speed	One Speed mode will allow the tool to operate at full-speed only. This mode helps maximize repeatability by eliminating speed variation when teasing the trigger.	ON/OFF	
Soft Start	The tool speed gradually ramps up at the beginning of a cycle. A gradual speed increase during soft start gives the operator more control as they get the fasteners started.		
Batch Decrement	Batch Decrement mode allows the loosening and re-tightening of a fastener when using batch count without increasing the batch count or counting the fastener multiple times.		
Auto Jump to Pset #	Auto Jump to Pset # enables a particular Pset to automatically select another Pset upon completion of a batch of fasteners. Useful for applications with multiple tightening stages, or where one tool is used for tightening with different requirements in a consistent sequence.	OFF, P1-8	

8. Tool Clock

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

9. Maintenance Interval Alarm

Up to three different Maintenance Interval Alarms can be set through the Utilities Page of the INSIGHT Connect application; the default "Lubricate Drivetrain" alarm and two custom alarms.

The alarms can be set based on either cycle count or number of days.

The alarms can also be set to either disable the tool once the set day or cycle value is reached, or simply display a maintenance alert and allow the operator to continue to use the tool.

10. INSIGHT Connect Application

In addition to the settings listed above, the following parameters can be adjusted in the Mobile or Desktop versions of the INSIGHT Connect application.

10.1 Tool Setup > General Setup

Parameter	Description	Setting Options	Default Setting
Pset Mode	Allows the tool to be programmed internally only, externally only, or through either method.	Internal, External, and Both	Both
Sleep Timeout	Controls the length of inactivity before the tool goes to sleep.	5-9999 seconds	300 seconds
Keep Alive	Prevents the tool from going to sleep.	ON/OFF	OFF
Passcode Enable	Requires a passcode in order to change any tool parameters.		ON

10.2 Tool Setup > Interface Setup

Parameter	Description	Setting Options	Default Setting
Headlight Brightness	Brightness of the white LED headlight.	OFF, Low, Medium, and High	High
Cycle Status Indicator Brightness	Brightness of the Red or Green cycle status indicator.		
Headlight Timeout	Length of inactivity before the LED headlight shuts OFF.	1-15 seconds	15 seconds
Tool Display Settings	Turn ON/OFF the tool display.	ON/OFF	ON
Buzzer Settings	Control the settings for the audible alert buzzer.	OFF, For Failed Cycle, and Batch Complete	OFF
Tool Keypad Settings	Enable or Disable the tool keypad.	ON/OFF	ON

11. Utilities Page

Parameter	Description
Firmware Management	Update tool firmware.
Factory Reset	Reset tool to factory default settings.
Wi-Fi Certificate Download	Upload certificate to Wi-Fi tool.
Error Codes	Search for error code descriptions.
Result Screen	Display end of run results and status.
Maintenance Interval Alarm	Set thresholds for maintenance warning.

12. RTS Connect Setup Procedure

12.1 Introduction

The RTS algorithm takes measurements during the tightening, and reacts to various inputs to ensure shut-off at a repeatable point. Each tool must be calibrated for the intended application.

For the RTS algorithm to function as designed, Flush Detection must be set properly for each application. The various Flush detection levels (L1-L7) allow the tool to be tuned for various joint types, including hard and soft joints with or without prevailing torque.

Note: To ensure optimal repeatability, the Flush Detection Level must be set as the first step of the setup process.

12.2 Setup Procedure

12.2.1 Definition

For the purposes of this document, "Snug" is defined as when all parts being clamped by the fastener have been pulled together, and tension on the fastener is beginning to increase.

1. Set the tool to T1 (Torque Level 1).
2. Set the tool to L1 (Flush Detection Level 1).
3. Run the tool on a fastener for the intended application and allow the tool to shut OFF.
   a. If the fastener has reached snug, proceed to step 6.
4. If the fastener has not reached snug, increase the Flush Detection Level by one (L1 to L2).
5. Repeat steps 3 and 4 until the fastener head seats and snug is reached when the tool shuts OFF.
6. Keeping the Flush Detection Level the same, run the tool on several fasteners for the intended application and audit the snug torque.
   a. If audited snug torque values vary significantly, increase Flush Detection Level by one and repeat step 6.
   b. If audited snug torque values are consistent across the fasteners checked, Flush Detection Level has been set correctly.
7. To reach the desired final torque, increase the Torque Level (T1 through T40), run the tool on the fastener, audit, and continue to increase until the desired target torque is reached.

12.3 Tips and Additional Information

- Adjacent Torque Levels will have similar torque outputs. When adjusting the Torque Level in step 7, if the first audit torque value is much lower than the target, increasing in increments of 5 or 10 can speed up the process. Increase Torque Level in smaller increments once audit torque values are closer to the target torque.
- General Guidance for Flush Detection levels:
  - L1-L3: Soft to Hard joints, negligible prevailing torque, no impacting before snug point.
  - L4-L5: Soft to Hard joints, slight prevailing torque and impacting before snug point.
  - L6-L7: Medium to Hard joints, prevailing torque and impacting before snug point.
- For prevailing torque joints with a large angle after the snug point, L6 and L7 may detect snug late, or not at all. If running in L6 or L7 and the tool does not shut OFF, decrease Flush Detection Level by one and re-test.

13. Tool Fault Codes/Troubleshooting

Fault Code	Category	Notes	Actions/Solutions
A-F1	Firmware Upgrade	Invalid Firmware Image Size	Confirm the firmware image is correct.
A-F2		Invalid Firmware CRC	Check the connection and retry.
A-F3		Invalid Image ID	Confirm the firmware image is correct.
A-F4		Timeout	Power-cycle the tool and retry firmware update.
A-11 - A-17		UART/MCE Issue	
D-A0	Communication	MC Firmware Version is not matching.	Update Firmware.
D-D0		Incorrect Bluetooth Firmware	Possible damaged electronics hardware. Contact nearest **Ingersoll Rand** service center.
D-F2 - D-F6		Timer Faults	
D-XX		Hardware Issues	
E-FF	Motor Controller Fault	System Fault	
E-01		Hall Fault during running	
E-02		I^2T	
E-03		Motor Stall	
E-04		Over Current by ADC read	
E-05		Over - Temperature	Add a delay between cycles to allow time for the tool to cool.
E-06		Current Offset	Possible damaged electronics hardware. Contact nearest **Ingersoll Rand** service center.
E-30		MC System Fault	
E-31		Over Current - Hardware	Add a delay between cycles or reduce duty cycle. Contact nearest **Ingersoll Rand** service center if error occurs frequently.
E-32		MCU Over - Temperature	Add a delay between cycles to allow time for the tool to cool.
E-33		Hall Fault when Motor Start	Possible damaged electronics hardware. Contact nearest **Ingersoll Rand** service center.
E-34		UART Faults	
E-1C		Low Voltage	Install a fully charged battery.
E-1D		Critical Low Voltage	

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.

ingersollrand.com