



TL-VP1T-MIM
Edition 1
September 2021

Cordless Drill/Driver

QX Series

Maintenance Information

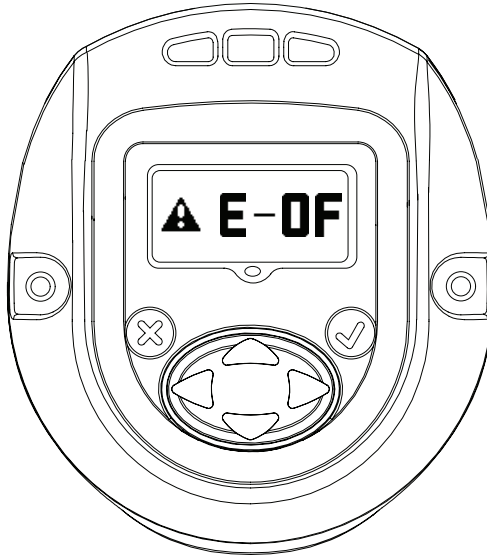


Save These Instructions

 **Ingersoll Rand®**

Tool Diagnosis

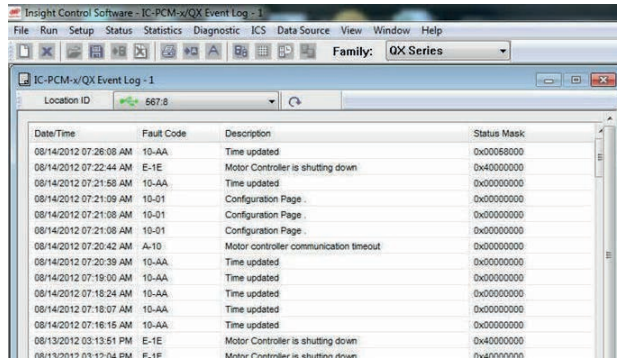
1. Before servicing this unit, you will need a fully charged battery of known voltage.
2. Install this battery into the tool and press the trigger. The tool should run normally, with no abnormal sounds, and without any signs of problems.



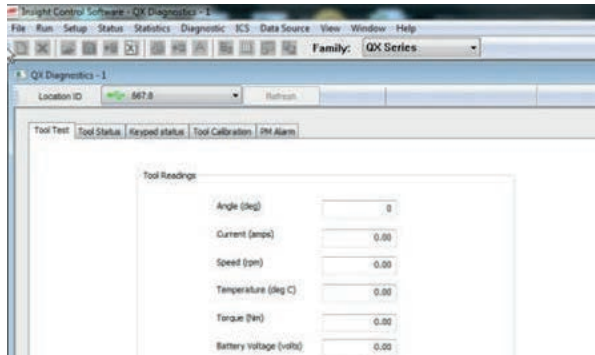
3. Check the tools display for any error messages displayed on the screen. If the screen is dark, you will have to depress the trigger to wake up the tool.
4. Consult the error code listing in this manual for possible solutions to this message.



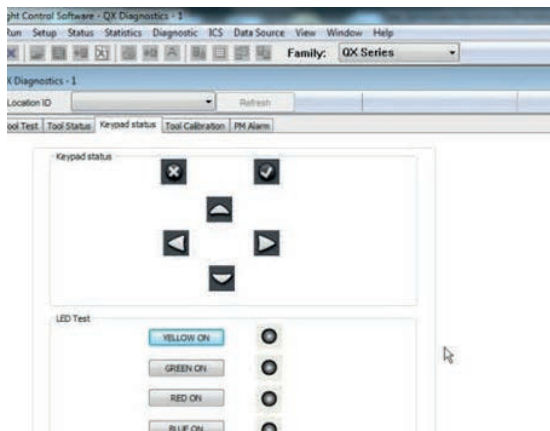
- Connect the tool to a PC through the mini USB port at the top of the tool. Have the PC running the ICS Program.



- Select QX Series under family then under the Run tab in the main menu bar, click on and run the IC-PCM/QX Event Log and select Location to reflect the tool. Consult the log for any Error Code listed and consult the Error Code listing in the ICS Manual (48619696) for possible solutions.



- Next select the Diagnostics tab on the menu bar. Then select System Diagnostics from the drop down menu. Examine the settings under the Tool Test, Tool Status, and PM Alarms tabs for any unusual settings.



8. Under the Keypad Status tab check the functionality of each of the keypad buttons and lights by clicking on their corresponding buttons on the screen. Now close ICS and disconnect the Tool.
-

Tool Disassembly



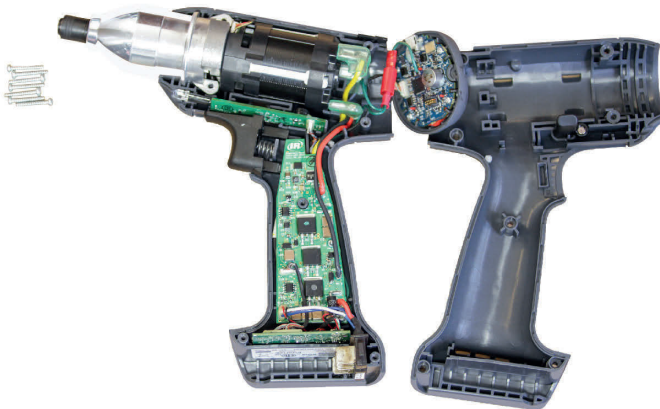
1. Remove the battery from the tool, and place the tool on the work bench with the Display facing up.



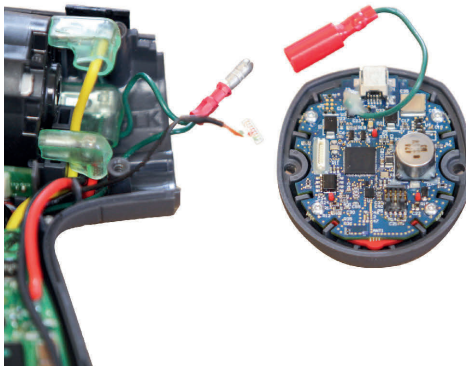
2. Using a T-10 Torx Bit remove the two display panel screws.



3. Using the same screwdriver now remove the housing screws. Remove the bottom screws first, followed by the top, middle, and finally the center screw.



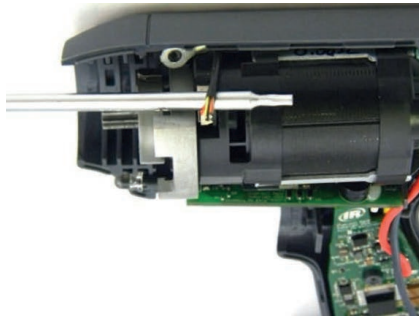
4. Carefully remove the housing clamshell ensuring that you do not damage any of the cables or connectors.



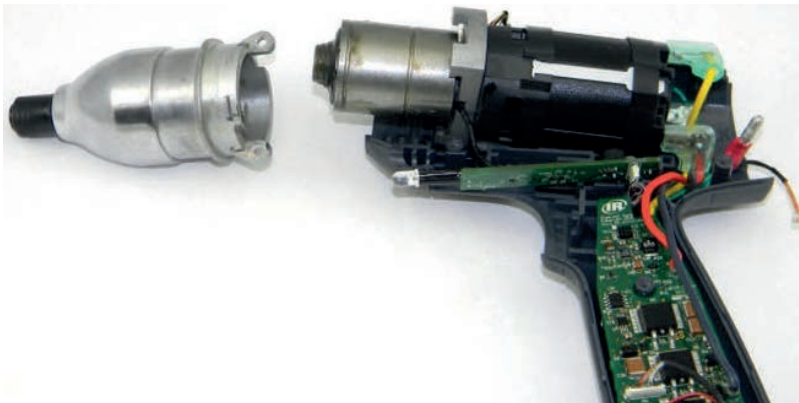
5. Disconnect the pin connector first, then disconnect the ground wire slip connector. Remove the USB port cover from its slot in the housing.



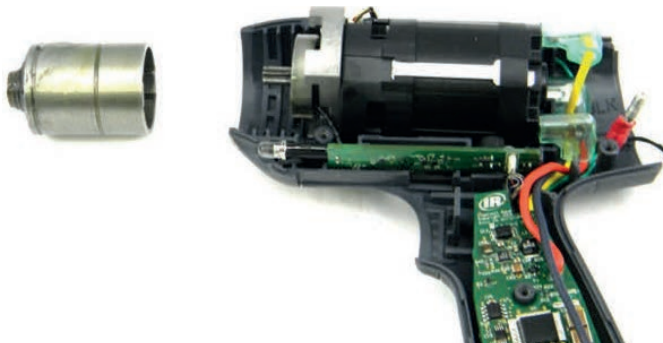
6. Remove the trigger by pulling the trigger up slightly and out of the housing. Also remove the reverse lever from the housing.



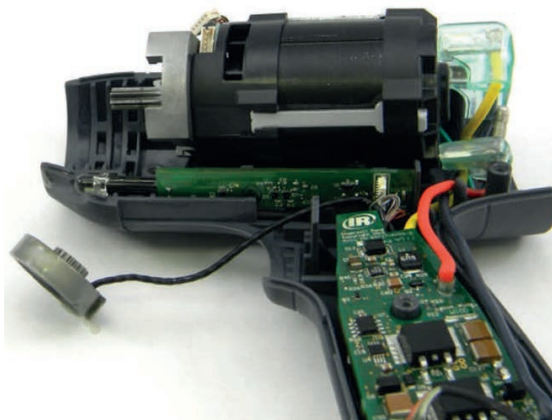
7. Remove the hall cable connector from the motor. This connector is located at the top of the motor. It should be removed by placing the shaft of a small screwdriver under the cable to support it just behind the connector then gently pulling up on the screwdriver to unplug the connector.



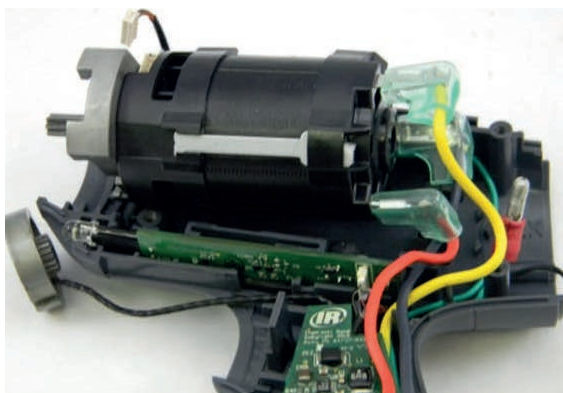
8. Tilt the motor and gear case assembly up at a slight angle, then carefully remove the gear case assembly from the motor.



9. If the Gear Pack has remained on the motor, remove it from the motor, and set aside. We will disassemble this later in the program.



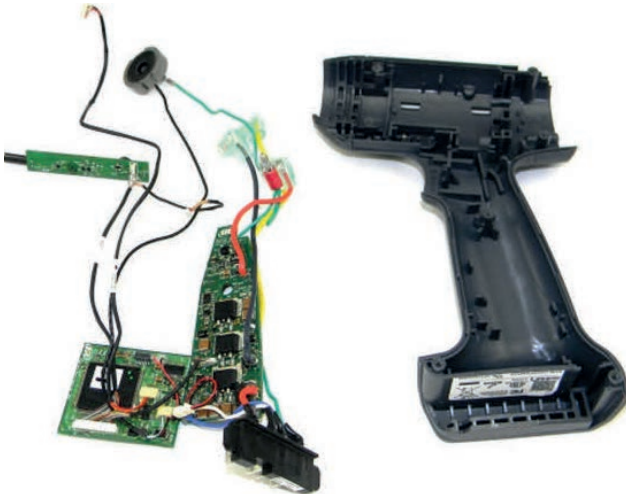
10. While tilting the motor up slightly, remove the transducer from the front of the motor.



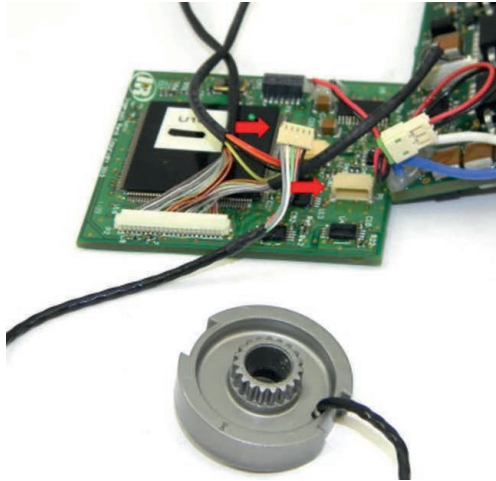
11. Unplug the three motor terminals from the rear of the motor, by pressing the locking detents on the connectors under the clear boots. Note the orientation of the three terminals. They must be installed in the same orientation when the tool is reassembled. Now remove the motor from the housing.



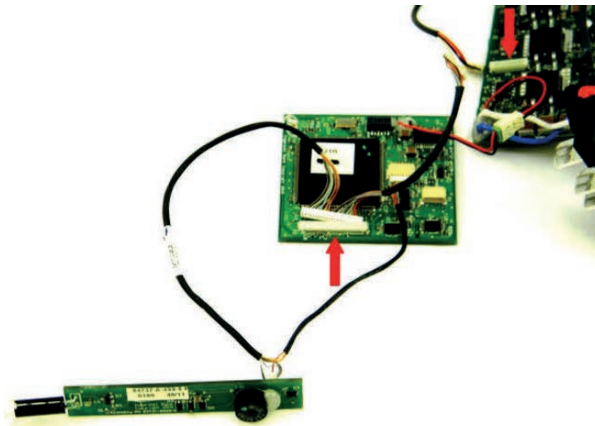
12. Using a 2 mm Allen wrench, remove the two Allen Screws which hold the motor mount onto the motor. Then remove the mount.



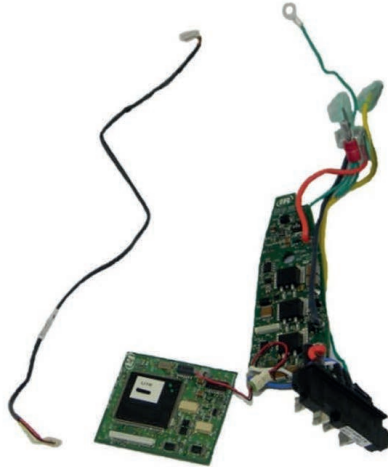
13. Carefully remove the electronic components (circuit boards, transducer and cables) from the housing.



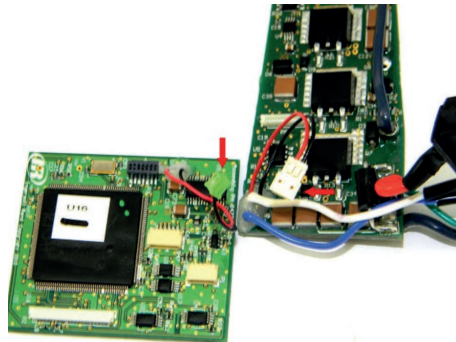
14. Disconnect the transducer cable from the Foot Control Board.



15. Disconnect the Interface cable which runs from the trigger board to both foot PCB and the handle PCB. There is one connector on the foot PCB and one on the handle PCB.



16. This will leave the Hall Cable which can now be disconnected from the foot board and the cable removed.



17. Disconnect the Handle PCB from the Foot PCB at its connector. This completes the disassembly of the electronic components.

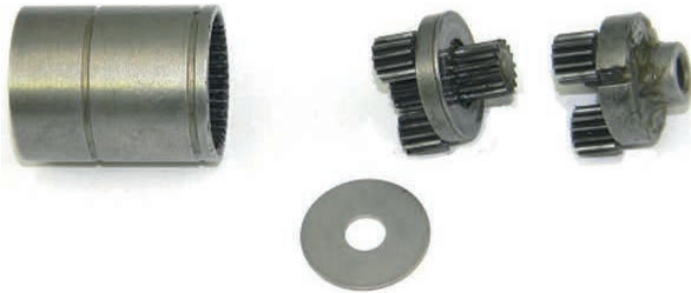
Gear Case and Gear Pack Disassembly



1. For units with the ¼" quick change spindle, disassemble the spindle as follows. Remove the spiral spring clip from the front of the spindle, then remove the quick change collar, spring, spring support and rear spiral snap ring.



2. Then remove the ball from the spindle by inserting a punch or thin blade screwdriver into the hex of the spindle and pushing the ball out of its hole. Examine all parts for wear and damage.
3. For all models, using the speciality tool Part # VP1-00003 Bearing Nut Tool and the Holding Jig Part # VP1-00004, to securely hold the gear case, reach inside the gear case and unthread the nut.
4. This will allow you to remove the nut, thrust washer, thrust bearing and spindle. Examine all parts for wear and damage.



5. To disassemble the gear pack, slide the planetary gear spindles and the plate out of the ring gear.



6. Inspect the ring gear for wear and damage.



7. Disassemble the planetary gears and the pinion gear from the spindle assemblies. Inspect the gear teeth and shaft holes for wear and damage. A pinion gear is used on the 4 Nm and 8 Nm tools only.



8. Also check the planetary spindle shafts for wear and damage. This completes the disassembly of the unit.

Tool Assembly



1. Install the motor mount onto the motor. Align the mount so that the slot in the mount is on the opposite side of the motor from the motor connector as shown in the photo. Torque the motor mount screws to 0.5 Nm.



2. Install the transducer over the motor shaft and onto the motor. Be sure the transducer cable is on the center to left side of the notch of the motor mount. If the cable is not orientated in this way it will be damaged when the tool is reassembled.



3. Install the Gear Pack first, ensuring that the motor shaft engages into the gearing. Next, install the Gear Case assembly into the motor mount.

4. Ensure the transducer cable is to the left of the gear case ear so it can be routed properly and will not be damaged when the motor/gear case assembly is installed into the housing.



5. Route the hall cable through the housing following the shadow line, leaving approximately 1 ½" of cable above the housing where the cable connects to the motor.



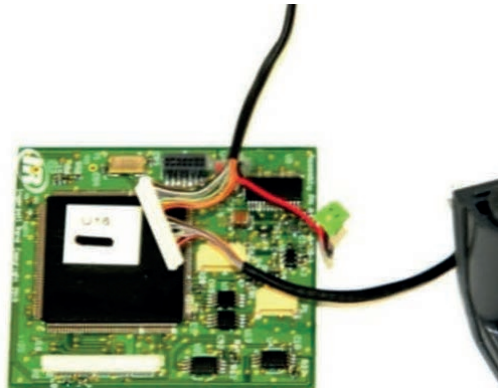
6. Route the green ground wire through the housing and to the top front screw lug.



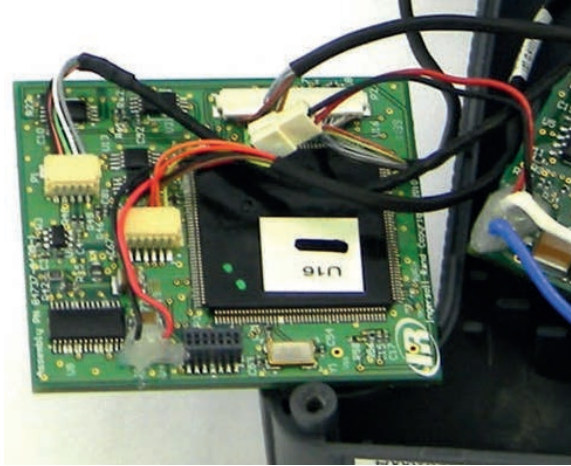
7. Install the motor/gear case assembly into the Housing. Seat the rear of the motor first then, carefully lower the assembly into position. Add a service loop to the transducer cable under the gear case ear. Ensure that all the cables are clear of the assembly and that they have not been pinched or cut. Also be sure that the assembly is fully seated in the housing.



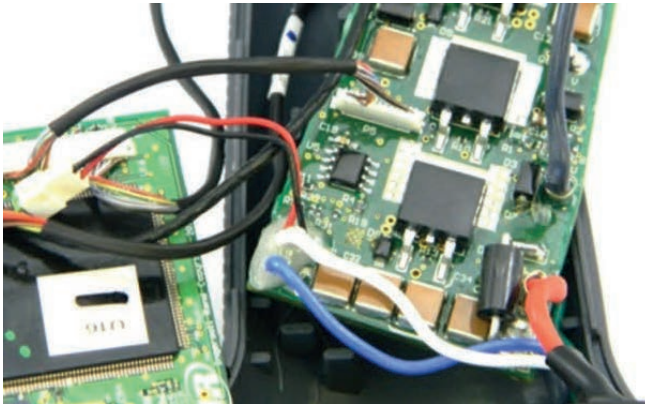
8. Connect the second connection from the end of the Interface Cable to the trigger board, and insert the trigger board into the housing.



9. Connect the connector of the Interface cable to its connector on the foot PCB.



10. Connect the Hall Cable to its connector on the foot PCB, the transducer cable to its connection, and the connection between the foot PCB and the handle PCB.



11. Connect the Interface cable to the handle PCB.



12. Install the foot PCB and the battery interface. Retrace and fully seat all the cables, ensuring that they are in their proper position. Also ensure that the trigger board is still in place. Any cables which are not seated properly will be damaged resulting in the tool not performing properly.



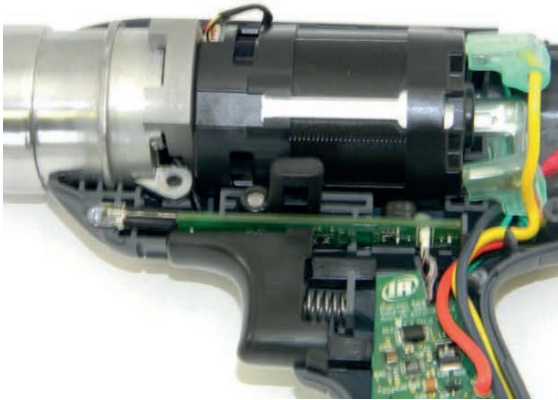
13. Connect the three motor leads, in their proper orientation. The black lead is connected to the bottom lug (closest to the housing). The yellow lead to the top lug, and the red lead to the middle lug (closest to the trigger board). There are also markings on the housing halves to aid in the orientation of these leads. Also ensure that the terminals are connected at the proper angle.



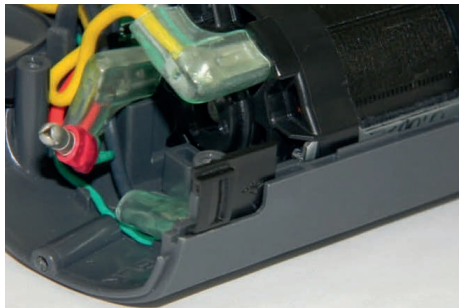
14. Connect the Hall Cable with its connector on the motor.



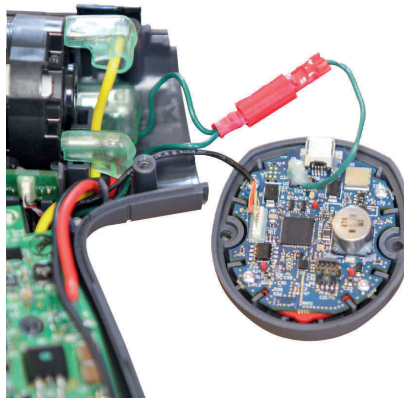
15. Install the Handle PCB onto the center screw lug. Ensure that the O-ring is in position on the lug underneath the board. Again ensure that all the cables are routed properly and fully seated.



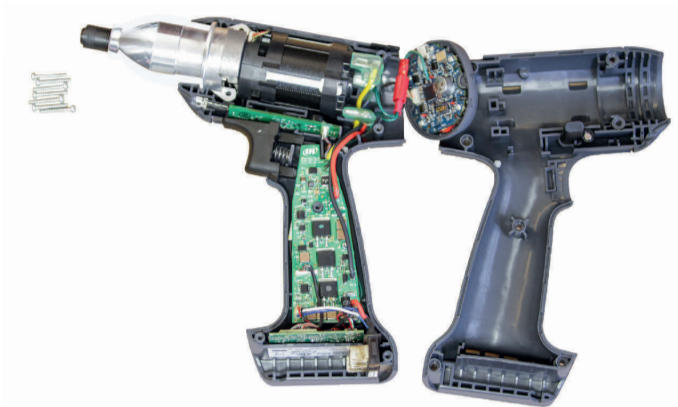
16. Install the trigger with the spring into the housing. Tilt the assembly at approximately a 45° angle with the rear down. Then slide the assembly into position. Also install reverse lever into the slot in the housing.



17. Install the USB port cover into its slot.



18. Connect the ground cable connector and the Interface cable connector to the display board.



19. Install the second half of the housing onto the unit by tilting the bottom of the housing and align the housing and the foot PCB. Slightly push forward on the board to ensure it seats into the slots in the housing.



20. Gently lower the housing down onto the unit. Ensuring that all of the components and cables are in their proper position. Closing the tool by starting at the bottom at the foot PCB and working your way to the motor and the top of the tool.



21. Install the housing screws in the tool to 1 Nm. Starting with the center screw, then the top two screws, proceeding to the middle and finishing with the bottom two screws.



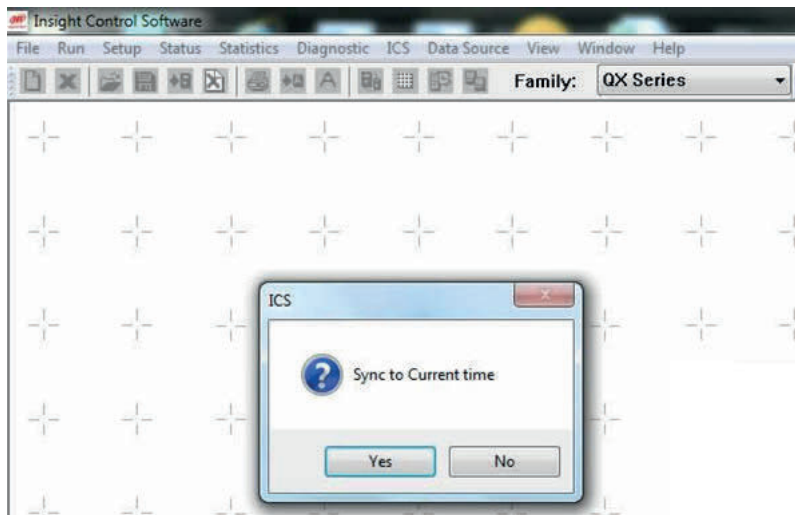
22. Install the backcap onto the housing and secure it with two screws tightened to 1 Nm.



23. Install the battery and ensure that the tool runs normally and no error codes. Then proceed to test and verify the tools performance.



- 1. Connect the tool to a PC with ICS loaded onto it.



- Open ICS, change the family to QX Series tools, and sync to current time.

Insight Control Software - QX Diagnostics - 1

File Run Setup Status Statistics Diagnostic ICS Data Source View Window Help

Family: QX Series

QX Diagnostics - 1

Location ID Refresh

Tool Test Tool Status Keypad status Tool Calibration PM Alarm

Manual Data Entry

	Factory Value	Current Value	New Value		
TR	0.00	0.00	0.00	Set	Reset
ASC	0.00	0.00	0.00	Set	Reset

Gearbox Loss

Gearbox Loss (%) Send

Calibration Settings

Status Auto

Calibration Result

Cycle #	From Tool	From ETA

Current TR

Cycle counter

Reject reading Start

Measured Reading (Nm)

Resultant TR

Resultant TR value Send

- Under the Diagnostic tab on the main menu bar, select System Diagnostic and then the Tool Calibration tab.

Insight Control Software - QX Diagnostics - 1

File Run Setup Status Statistics Diagnostic ICS Data Source View Window Help

Family: QX Series

QX Diagnostics - 1

Location ID 567.8 Refresh

Tool Test Tool Status Keypad status Tool Calibration PM Alarm

Manual Data Entry

	Factory Value	Current Value	New Value		
TR	17.82	17.56	0.00	Set	Reset
ASC	1.52	1.52	0.00	Set	Reset

Gearbox Loss

Gearbox Loss (%) -1.41 Send

Calibration Settings

Status Auto

Calibration Result

Cycle #	From Tool	From ETA

Current TR 17.56

Cycle counter

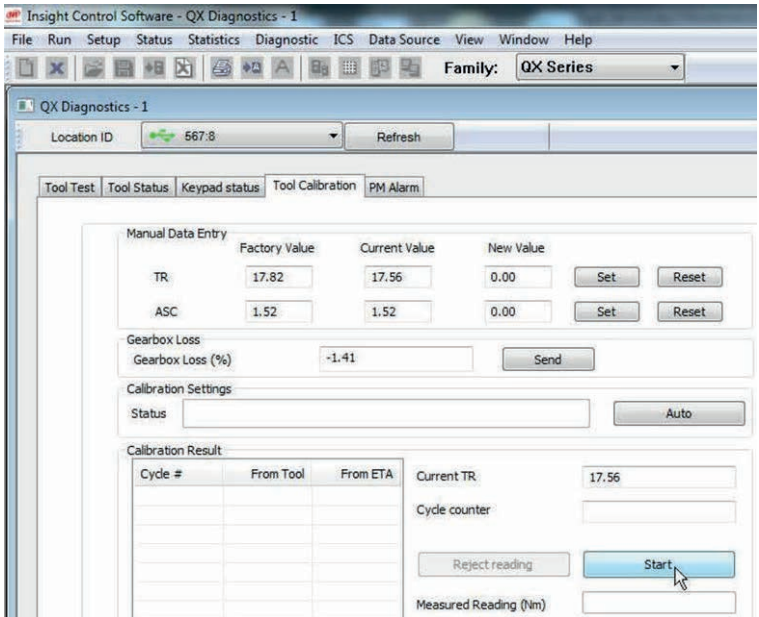
Reject reading Start

Measured Reading (Nm)

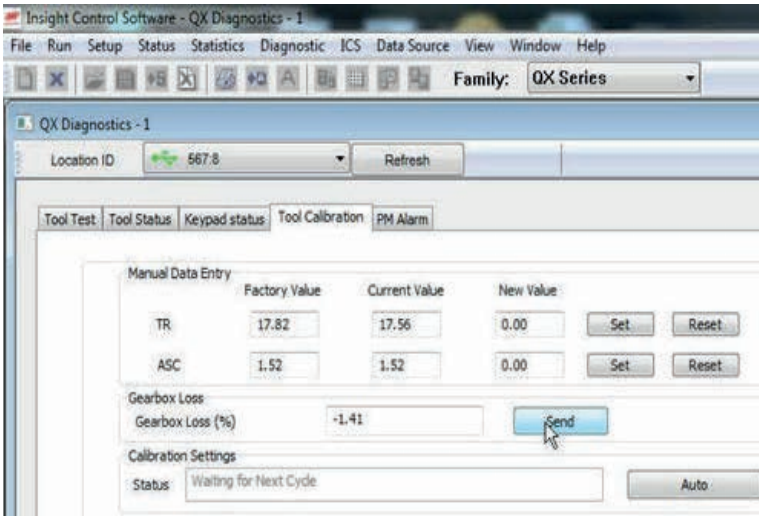
Resultant TR

Resultant TR value Send

- 4. Select the proper Location ID for the tool you wish to be tested.
- 5. Connect an ETX or ETA to the PC. Insure that the Auto button appears. This allows the torque tester to automatically enter the torque valves.



- 6. Click on the start button to begin the test and then run 10 runs at 100% torque on a medium test joint, then click on the stop button.



7. Click the send button to send the data to the tool.

Insight Control Software - QX Diagnostics - 1

File Run Setup Status Statistics Diagnostic ICS Data Source View Window Help

Family: QX Series

QX Diagnostics - 1

Location ID 567.8 Refresh

Tool Test Tool Status Keypad status Tool Calibration PM Alarm

Manual Data Entry

	Factory Value	Current Value	New Value		
TR	17.82	17.56	0.00	Set	Reset
ASC	1.52	1.52	0.00	Set	Reset

Gearbox Loss

Gearbox Loss (%) -1.41 Send

Calibration Settings

Status Waiting for Next Cycle Auto

Calibration Result

Cycle #	From Tool	From ETA
1	1.569	1.640
2	1.587	1.580
3	1.569	1.760
4	1.612	1.750
5	1.604	1.830

Current TR 17.564

Cycle counter 5

Reject reading Start

Measured Reading (mm)

Resultant TR

Resultant TR value 18.933 Send

8. Click on the send button next to the Resultant TR Value to send this value to the tool.

Notes:

Notes:
