



USER INSTRUCTIONS

Limitorque QX Electronic Actuator

FCD LMENIM3313-01 – 12/09

Quick Mount and Start Instructions

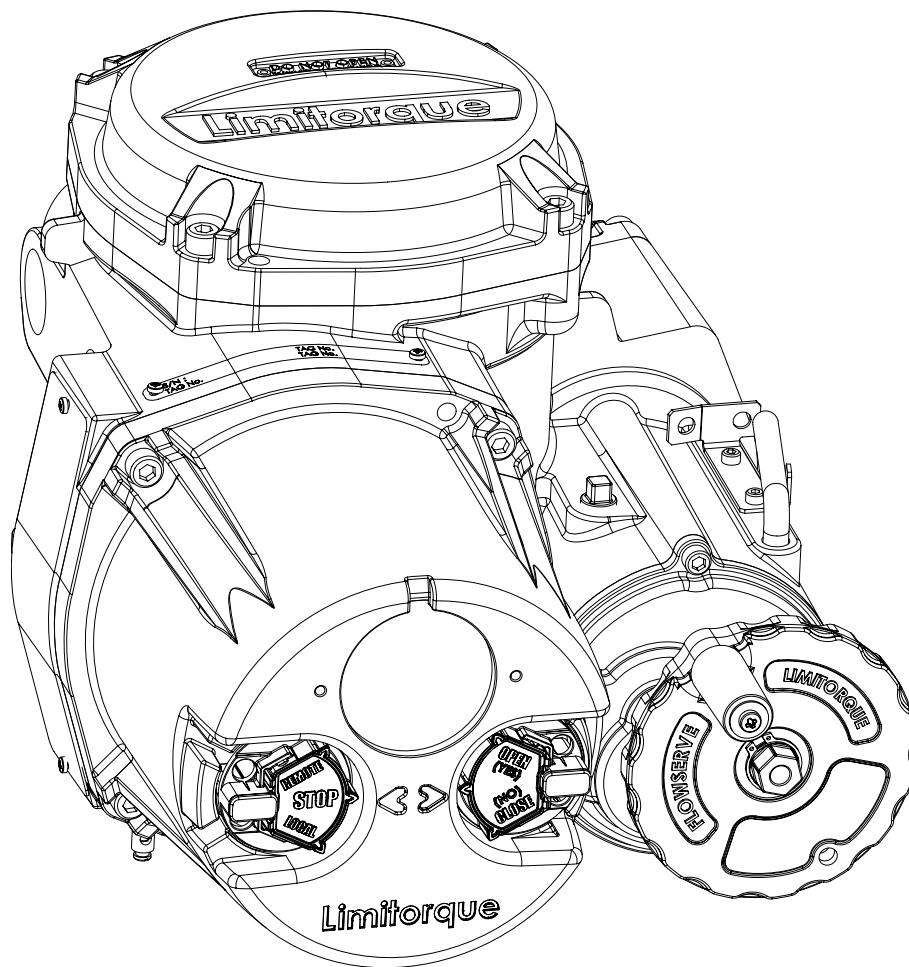
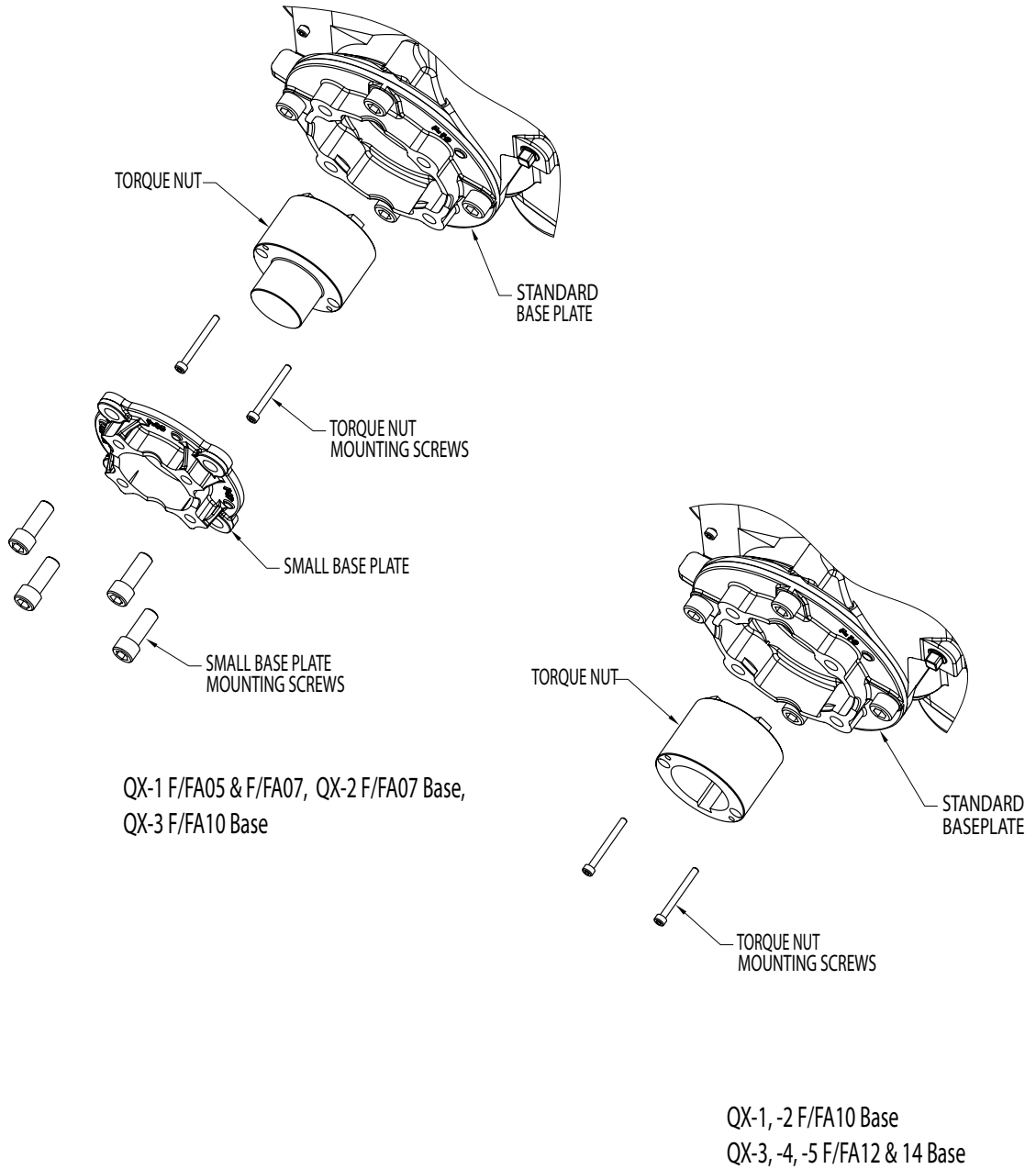


Figure 1.1 – Exploded view of QX bases



1

Quick Mount

1.1 Preparing the Stem Nut

The QX has two (2) basic base designs:

- Torque-only (90°) operation
- Multi-turn operation (up to 20 multi-turn rotations – 7200° total)

Torque Applications

Standard B4/B4E Base

The standard QX actuator base is the stem nut for torque-only. It includes a mounting plate and steel torque nut, which may be machined to fit a valve or gearbox. A B4E torque nut can be provided and may be installed to allow for extended stem acceptance.

Table 1 – Available QX Flanges

		QX-1	QX-2	QX-3	QX-4	QX-5
Flange 1	ISO 5210	F05/F07	F07	F10	N/A	N/A
	MSS SP-102	FA05/07	FA07	FA10	N/A	N/A
Flange 2	ISO 5210	F10	F10	F12 (OPT) F14 (STD)	F12 (OPT) F14 (STD)	F14
	MSS SP-102	FA10 (STD)	FA10 (STD)	FA12 (OPT) FA14 (STD)	FA12 (OPT) FA14 (STD)	FA14 (STD)

Disassembly – Flange 1

1. Remove base plate mounting screws and base plate.
2. Remove the torque nut. If the torque nut is difficult to remove, insert a suitable device into the drive sleeve through bore and gently tap it loose from the handwheel end.
3. Machine the torque nut to suit the valve stem or gearbox input shaft. Ensure sufficient clearance for a smooth, sliding fit.

Disassembly – Flange 2

1. Remove the two torque nut screws.
2. Remove the torque nut and screws. If the torque nut is difficult to remove, insert a suitable device into the drive sleeve through bore and gently tap it loose from the handwheel end.
3. Machine the torque nut to suit the valve stem or gearbox input shaft. Ensure sufficient clearance for a smooth, sliding fit.

Reassembly

1. Clean the torque nut thoroughly and lightly grease.
2. Replace the torque nut in the drive sleeve. Ensure the torque nut meshes with the drive lugs.
3. Reinstall the torque nut mounting screws.

1.2 Mechanical Installation onto Valve or Gearbox

Before installing the actuator onto a valve or gearbox, check the following to ease installation:

- Verify that mounting flange is suited dimensionally to mate with the actuator base. Ensure that it is perpendicular to the valve stem.
- Ensure the stem nut mates with the valve stem or input shaft. Keyed or splined shafts should exhibit a smooth, sliding fit with the key installed.
- Ensure there is adequate engagement of the stem nut with the valve stem or input shaft when mounted. Generally, the minimum length of engagement is 1.5 times the diameter of the stem.
- Ensure that the valve stem is not too long such that it bottoms out on the QX drive sleeve.
- Verify that mounting studs or bolts are the correct length to suit the thickness of the mounting plate.
- Verify hardware specifications for English style:
 - Socket head cap screw per ASTM A 574 and ANSI 18.3.
 - Hex head cap screw per SAE J429 Grade 5.
 - Verify hardware specifications for metric style: hex and socket head cap screws per Property Class 12.9.
- Clean and lubricate the valve stem or input shaft.
- Ensure adequate lifting facilities and slings are available at the installation site.

NOTE: Do not use the handwheel to lift the actuator.

1.3 Setting the Mechanical Stops on Quarter-turn Valves

1. Place the actuator at mid position halfway between the two mechanical stops. This can be done by turning the handwheel until one stop is encountered, then turning the handwheel in the opposite direction to reach the other stop while counting the turns required for full stroke. Then turn the handwheel in the opposite direction again half the number of turns to achieve mid position.
2. Place the valve in mid stroke position. Select the QX position based on the lugs on the torque nut and the slot in the drive sleeve. Install the torque nut and place the QX on the valve. Secure the QX to the valve.
3. Using the handwheel, move the QX to the close position. Back out the close stop as needed after loosening the screw securing the stop.

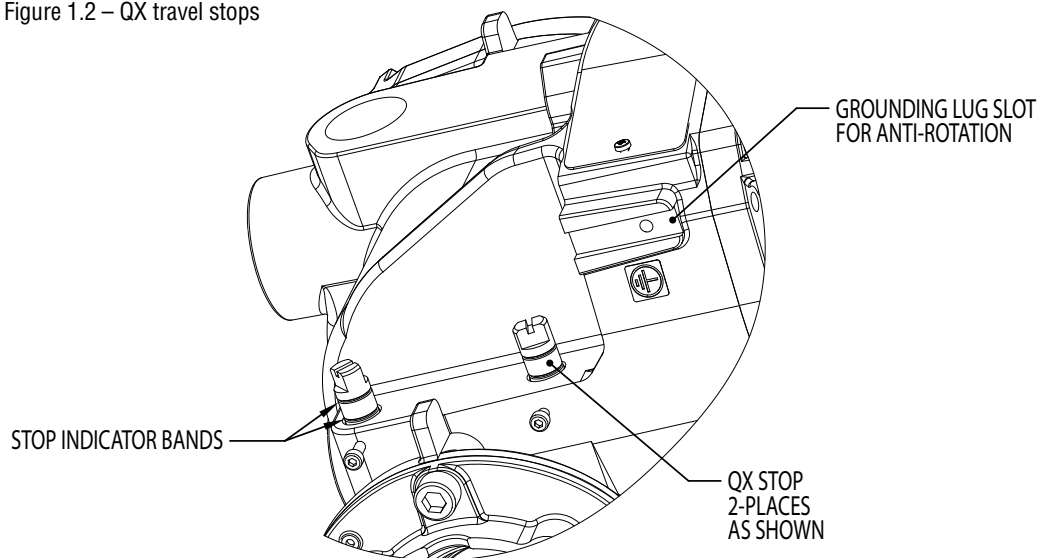
4. Save the close position using the electronic setup procedure.
5. If not already complete, loosen both screws securing the stops. While in the close position, turn the close stop against the drive sleeve, then back the stop off the drive sleeve assuring the stop does not contact the drive sleeve. This is approximately 0.5 to 1.5 turns of the stop.
6. Manually open valve, set the open position and save by using the electronic setup procedure
7. Turn the open stop against the drive sleeve, then back off the stop from the drive sleeve approximately 0.5 to 1.5 turns, assuring the stop does not contact the drive sleeve.
8. Electronically cycle the valve open and closed. While at each respective limit of travel and in the stopped condition, reconfirm that the stop does not contact the drive sleeve. To confirm, rotate the stop freely back and forth, encountering only O-ring drag. If the drive sleeve has not been loaded against the stop, secure the stop with screw to lock it in place. If the stop is loaded by the drive sleeve, the stop must be backed away further from the drive sleeve. The drive sleeve must be backed off the stop before adjusting stops.

NOTE: Do not adjust stops while stop is loaded

Failure to back the stop away from the drive sleeve at the open and close positions will result in the QX being overloaded during cycling.

9. There are two grooves or indicator bands cut into the stops to evaluate the position of the stops. Align the indicator bands with the edge of the housing to determine the approximate range of position for the stops. If the stops are backed out too far, the O-ring seal will be compromised and the unit will leak oil.

Figure 1.2 – QX travel stops



2 Quick Start

Quick Start provides step-by-step instructions for commissioning each QX actuator. These instructions are for the following:

- Position limits calibration – can be performed one of two ways:
 1. Electrical operation: See Section 2.1.2, Electrical Operation Feature.
 2. Handwheel operation: See Section 2.1.3, Handwheel Operation Feature.
- DDC operation: See Section 2.2, DDC Option.

When these Quick Start instructions are complete, the position limits will be set and the actuator will be ready for normal operation.

NOTE: The actuator has been configured with all customer-specified parameters and no further calibration should be necessary. If full valve data was not provided when ordering, or if changes are needed for parameters, see LMENIM3306, QX Actuator Installation, Operation and Maintenance Manual.

NOTE: Units are shipped with default operating time values based on unit size:

- QX-1: 5-20 sec, default 15 sec
- QX-2: 8-30 sec, default 30 sec
- QX-3: 15-60 sec, default 60 sec
- QX-4: 30-120 sec, default 60 sec
- QX-5: 60-120 sec, default 60 sec

These times are based on a 90° open to close span.

The operating time can be set as desired by following the instructions in document LMENIM3306, QX Actuator Instruction, Operation and Maintenance Manual.

2.1 Calibrate – Position Limits

1. Install the QX actuator on the valve.
2. Refer to the nameplate for the correct main power supply voltage. Switch on the main power to the unit.
3. Turn the red knob to the STOP position. The “SET CLOSE POSITION LIMIT” message will be displayed. When the red knob is in “LOCAL” or “REMOTE,” the liquid crystal display (LCD) screen will read “SET POSITION LIMITS.”
4. Calibrate end position limits one of two ways:
 - Electrically, using the control panel. See Section 2.1.2, Electrical Operation Feature.
 - Manually, using the handwheel. See Section 2.1.3, Handwheel Operation Feature.

Once the position limits have been set, the screen message will indicate the valve position as a percentage of the valve opening.

While setting limit switches, place the red selector knob in the “LOCAL” position to permit the actuator to run open or closed in push-to-run mode (inching) only.

▲ CAUTION: Extreme care must be taken as the valve approaches its end position.

The unit will not function with the red selector knob in the “REMOTE” position until both limit switches are set.

The existing configuration of the actuator/valve parameters may be viewed by entering the “SETUP” mode.

2.1.1 Entering the Setup Mode

1. Place the red selector knob in the “STOP” position.
2. Within 10 seconds, place the black control knob in the “YES” position, then the “NO” position, then again in the “YES” position (in quick succession—approximately one-two seconds).
3. The message “SETUP?” will appear in the LCD display for 10 seconds. If no setup action is taken within 10 seconds, the unit will reset.
4. Use the black control knob to answer “YES” or “NO” to the questions appearing in the display.

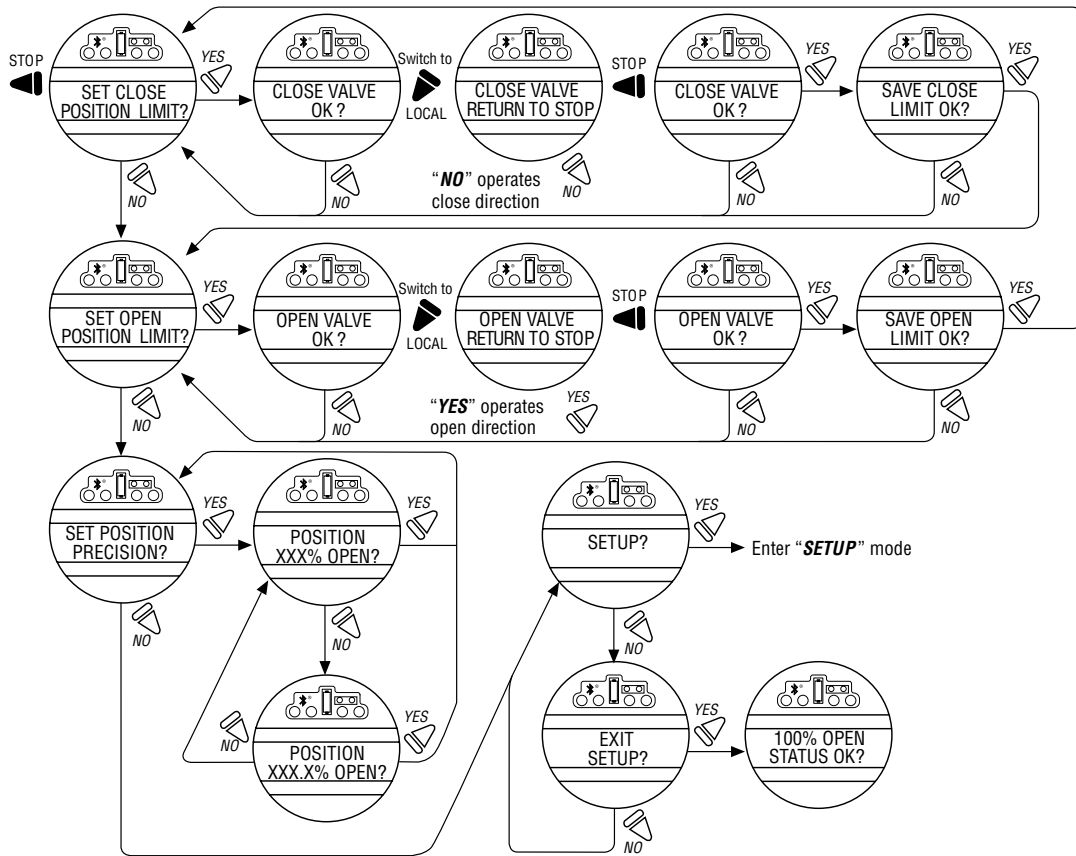
2.1.2 Electrical Operation Feature

This feature allows for quick and simple calibration. To set the position limits electrically, enter the “CHANGE SETTINGS” mode via the “SETUP” mode.

1. Enter the “SETUP” mode as detailed in Section 2.1.1, Entering the Setup Mode.
2. When screen prompt reads “CHANGE SETTINGS,” select “YES.”
3. The screen will display the “CHANGE SETTINGS” mode menu items. Select “NO” until screen displays “CHANGE POSITION SETUP.” User may select to set close limit first or open limit first.
4. Select “YES.” “CLOSE” or “OPEN VALVE - OK?” is displayed.
5. Place the red selector knob in the “LOCAL” position. Move the black knob in the intended direction. The LCD screens are shown in Figure 2.1.
6. When valve has reached desired position, return the red selector switch to “STOP” and complete calibration.

The position settings are now complete. The actuator will now function as ordered, and may be run electrically to inspect for correct operation.

Figure 2.1 – Electrical operation



2.1.3 Handwheel Operation Feature

To set the position limits manually, enter the “CHANGE SETTINGS” mode via the “SETUP” mode.

1. Enter the “SETUP” mode as detailed in Section 2.1.1, Entering the Setup Mode.
2. When LCD reads “CHANGE SETTINGS?”, select “YES.”
3. The LCD will display the “CHANGE SETTINGS” mode menu items. Select “NO” until screen displays “CHANGE POSITION SETUP?”
4. Select “YES.” See Figure 2.2. Manually set position limits:
 - a. Close position limit
 1. “SET CLOSE POSITION LIMIT?” is displayed.
 2. Select “YES.” “CLOSE VALVE - OK?” is displayed.
 3. Depress the declutch lever, and at the same time slowly rotate the handwheel until the clutch is fully engaged. Release the lever; the clutch will be retained in the handwheel mode by spring-loaded latches.
 4. Ensure the valve is fully closed, then move the valve in the open direction for one to two handwheel turns to allow for coasting of the motor.
 5. When the valve is in the desired position, select “YES” again. The LCD will read “SAVE CLOSE LIMIT OK?”
 6. Select “YES” if the valve’s close limit position is correct. The close position limit is set.

2.2 DDC Option

The following instructions assume that all DDC option parameters are set with the exception of the address.

1. After setting position limits, remain in the “SETUP” mode. If not in the “SETUP” mode, enter the “SETUP” mode as detailed in Section 2.1.1, Entering the Setup Mode.
2. When LCD reads “CHANGE SETTINGS?”, select “YES.”
3. The LCD will display the “CHANGE SETTINGS” mode menu items. Select “NO” until screen displays “CHANGE DDC?” Select “YES.” LCD will display DDC menu items.
4. Select “YES” for each menu item until “DDC ADDRESS OK?” appears. Select “NO.”
5. Enter an address from one to 250 by toggling “NO” until the correct address is displayed. User may select to hold the knob in the “NO” direction and the number will automatically increment by one until the preferred address is reached.

▲ CAUTION: The network address must be entered in accordance with the user address assignment sheet. This assignment sheet should correspond to the contract specifications. The same address must not be used anywhere else in the same network.

The DDC address does not have to be set to exit the setup.

2.3 Check the Settings

1. Operate the valve to the fully “CLOSE” position. Verify that the “CLOSE” (default GREEN) LED illuminates just as the travel limit is reached, and the valve position is displayed as “0% OPEN.”
2. Operate the valve to the fully “OPEN” position. Verify that the “OPEN” (default RED) LED illuminates just as the travel limit is reached, and the valve position is displayed as “100% OPEN.”



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