



# *USER INSTRUCTIONS*

## ***LIMITORQUE MX/QX Dashboard***

FCD LMENIM2338-01

***Installation  
Operation  
Maintenance***



***Experience In Motion***

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## About MX/QX Dashboard Software

The MX/QX is the non-intrusive intelligent actuator of choice for users demanding safety, quality, ease of configuration and technology leadership. Flowserve Limitorque's commitment to technology leadership is demonstrated in an available Bluetooth® option that permits a user to download or upload configuration routines via a standard low-power wireless communication path to an actuator. The MX/QX actuator can communicate via Bluetooth with a Bluetooth-equipped PC, PDA, or cell phone compatible with the Microsoft Windows® Mobile platform and the MX/QX Dashboard actuator diagnostics GUI (graphical user interface) software. This document outlines the flexibility of the Dashboard software.

The MX/QX Bluetooth option contains a Frequency Hopping Spread Spectrum (FHSS), which enables a reliable communication link, even in a "noisy" environment. The Bluetooth option also contains 128-bit data encryption to protect the privacy of the link. Bluetooth communication is accessible up to 10 meters (~30 ft.) from the actuator in all directions, and the ability to enable the Bluetooth communication link is password protected. When the Bluetooth link is enabled, a visible blue LED in the controls LCD window signifies that an active Bluetooth link to the actuator is established.

The Dashboard actuator software program permits a user to easily access either the configuration routines or the diagnostics capability of the MX/QX actuator using a Bluetooth-equipped PC or PDA with the Windows Mobile 5 platform. Dashboard is driven by GUI and parallels the menu selections of the MX/QX (see Installation and Operations manuals LMENIM2306 and LMENIM3306). It can be used to change or view configurations up to 10 meters from the actuator when a Bluetooth link is established. A secure Bluetooth link must be established before configurations can be altered, ensuring security and safety. Once the link is established, Dashboard can be used to change or view the default configuration in either **active online mode** or **background mode**.

**Online mode** allows a user to make unit configuration changes in real time by simply answering "Yes" or "No" to the menu prompts. Exiting the program saves the changes to the MX/QX. These changes can be subsequently downloaded from a Bluetooth-equipped PC or PDA and uploaded to other

MX/QX actuators that require identical configurations. This feature speeds the setup of the remaining actuators.

**Offline mode** allows a user to program a unit configuration, save the configuration to a PC or PDA, and upload into an MX/QX once the Bluetooth link is established. This feature enables the user to assign a unique configuration for any number of actuators in a non-volatile environment, save it to the computer device, and schedule the upload to the actuators when planned maintenance is performed.

Diagnostics can also be downloaded from the actuator into a PC or PDA via Dashboard and saved for further evaluation. Dashboard can be used to analyze this data or e-mail it to Flowserve Limitorque for evaluation.

These features are available up to 10 meters from the MX/QX actuator equipped with the Bluetooth (BT) option. Dashboard can also be used with the IrDA port supplied with each MX/QX unit. IrDA (IR) communication is limited to < 1m. It also requires a link to be established, but the effective communication distance is typically less than one meter to avoid cross-communication with neighboring devices.

When the MX/QX software is revised, Dashboard can be used to implement newly released software and upload it to the MX/QX. It is recommended that the IrDA link be used to upload new software into the MX/QX actuator.

**NOTE:** This version supports only the ENGLISH language option.



## Installing and Activating Dashboard

Dashboard is supported on the following computer systems:

- PDA - Microsoft Mobile 5 or 6 operating system only with Bluetooth and Infrared capability.
- Laptop\* - Microsoft XP® operating system with Bluetooth and Infrared capability. Microsoft *Windows VISTA® not supported*.
- Desktop\* - Microsoft XP® operating system with Bluetooth and infrared capability. Microsoft *Windows VISTA not supported*.

*\*Internal or external Bluetooth or infrared devices supported on most PCs. Refer to manufacturer's instructions for installation.*

Dashboard is available free of charge when the MX/QX with the Bluetooth option is purchased, and it can be downloaded from [www.limitorque.com](http://www.limitorque.com) or on CD.

**NOTE:** A nominal fee is charged for Dashboard if used on the infrared equipped only MX/QX actuators.

### PDA Installation

1. Using Microsoft Active Sync®, copy the dashboard.cab file to the PDA directory of your choice .
2. On the PDA, open the folder where the .cab file resides and select it.
3. Follow the installation instructions (Windows Mobile generated).

**NOTE:** Dashboard .cab files for the PDA are provided as Widcomm or Wincomm versions. If the program generates an error after installation, the incorrect version was installed.

### PC (non-PDA) Installation

1. Insert the CD in your PC CD drive.
2. Open file explored and select the setup.exe from the CD drive directory.



3. Click OK and follow the installation instructions.

Dashboard (PDA or PC) is encrypted and requires a key to unlock the encryption. When the Dashboard software is first activated on your device, a keycode will appear. For example:

- Dashboard Keycode = 7790793D6995DD8

This keycode is then used to generate a random key to unlock the software. For example:

- Dashboard Key = 699907DD893705D

Each key code is unique for every PC and PDA; therefore, the end user must obtain a key code for every installed platform.

Once the key is validated, the end user must accept the terms of the agreement prior to first use.

*The key to unlock the code is available from the factory by calling 434-528-4400 and asking to speak with a service representative.*

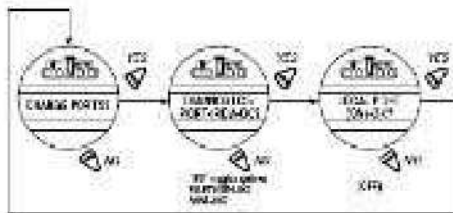
## MX/QX Configuration

To configure the MX/QX “port” setting, refer to the LMEIM2306/3306 for detailed instructions.

To use the MX/QX Downloader option on the dashboard, the MX/QX must be configured for IRDA in the “port” setup.

The ModSim option on the Dashboard is supported either via IR or BT.

Setup example for the IR setting in the “port” menu:



Once the port is configured, Dashboard may be used to communicate with the MX/QX via the *user* selected Local port.

**Note:** When using the IR option, line of sight is required with the device. For best results hold the IR device approximately 12 cm or less, from the actuator. BT option supports a maximum distance of 10 meters from the device.

Configuring the MX/QX BT option:

- In the ‘ports’ menu, select the BT port.
- Each BT-equipped MX/QX has a unique identifier. Note for future reference.
- Configure the BT password, a maximum of 16 alphanumeric characters.
- **NOTE:** Limitorque strongly recommends the use of a non-default password on the MX/QX for security reasons.
- The MX/QX is now ready for use with the Limitorque Dashboard application.

To obtain the default password or for password recovery, service is available. Contact Limitorque service coordinator at (434) 528-4400.

## Creating the Dashboard BT Link

This document is designed to demonstrate the capabilities of the Bluetooth link for communication with the MX/QX. IR communication is identical except for the initial selection of the IR/COM link. From this point forward, the BT link shall be used as a reference.

The link is established per the following procedure:

- Verify the MX/QX is configured for the BT port option.
- Record the MX/QX password.
- Using the Dashboard application, perform the following:
  - Select the "Bluetooth" button.



The Dashboard application will scan for all BT devices in range.

**NOTE:** The application will identify all BT devices in range including and not limited to cell phones and PCs.



**Note:** The FLXMX/QX refers to the MX/QX actuator.

- If the desired actuator does not appear in the scan window, move closer to the actuator and press the "Rescan" button. If the actuator still does not appear in the scan window, verify the MX/QX actuator in question.
- Select the desired actuator with the mouse cursor (PC application) or stylus (PDA application) and wait for the "ACCEPT" button to activate.

**NOTE:** If the MX/QX is configured for password protection, enter the password in the Dashboard input field when prompted.

**Proceed to page 9.**

## Dashboard Offline Mode

The Dashboard offline mode allows the user to configure the MX/QX configuration prior to the system upload. The user is allowed to change parameters associated with a standard MX/QX configuration such as REMOTE mode, LOCAL mode, ESD, etc. Factory-set parameters: VOLTAGE, FREQUENCY, UNIT SIZE, UNIT SPEED, LIMIT SWITCHES are not configurable using Dashboard, thus allowing the user to upload a desired configuration to similar installed MX/QX's without the risk of altering factory-set "as built" configuration.

To access the offline mode, perform the following as illustrated:



The "Offline Mode" must be checked.

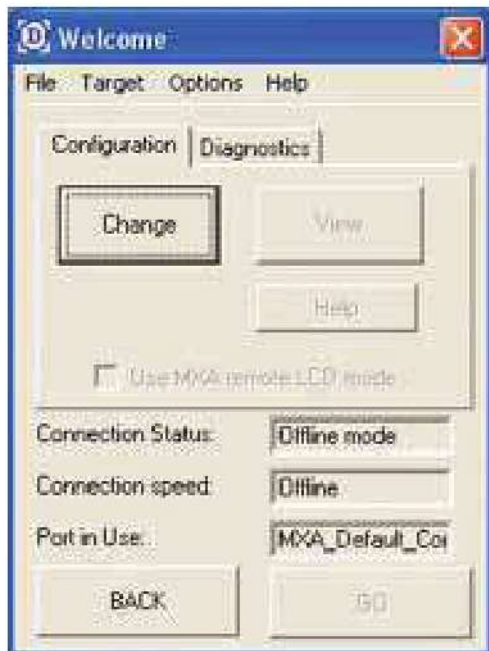
- Once the "Offline Mode" is selected, the "GO" button will activate. Select and proceed to page 9.



## MX/QX Configuration via Dashboard

This section describes the available configuration options applicable to the MX/QX. The below illustrations are applicable to the offline and online modes.

Once in the Welcome screen below, proceed with the MX/QX configuration detailed below:



In the OFFLINE mode, the following user access is available:

File > Exit – Exits the offline mode

Target > Compare – Allows for saved file comparison

Options > Download – Opens the MX/QX Downloader application

Options > Modsim – Opens the Modsim application

**NOTE:** All other links are not accessible.



In the ACTIVE mode, the following user access is available:

File > Exit – Exit the online mode

Target > Config > Download – Downloads the MX/QX configuration

Target > Config > Upload – Uploads a configuration to the MX/QX

Target > Config > Compare – Compares the saved configuration to the recently downloaded configuration

Target > Reset – Resets the MX/QX resulting in a lost link

Options > Download – Opens the MX/QX Downloader application – IR OPTION only

Options > Modsim – Opens the Modsim application; can be used with BT or IR

**NOTE:** All other links are for factory use only.

## MX/QX Configuration Detailed

This section describes the options and data available using the Dashboard application. Data includes Frequency Domain Analysis (FDA), diagnostic information including motor temperature, encoder status and firmware version information.

To access the detailed data, perform the following once a link is established:

**WARNING:** For safety reasons, configuration changes require REMOTE-STOP-LOCAL switch position in the "STOP" mode.

Press VIEW in the WELCOME screen and observe for below operation.



The user has a choice of pressing ABORT; once the read cycle is completed, the ABORT button changes to OK.

Once the register data download is completed, the next display is as follows:



In the *Configuration Selection*, the end user has the option to change the following parameters [COMMIT button saves the desired changes]:

**CONFIGURATION SELECTION OPTIONS:** Configuration follows menus in the MX/QX 10 MS. Consult 10M.

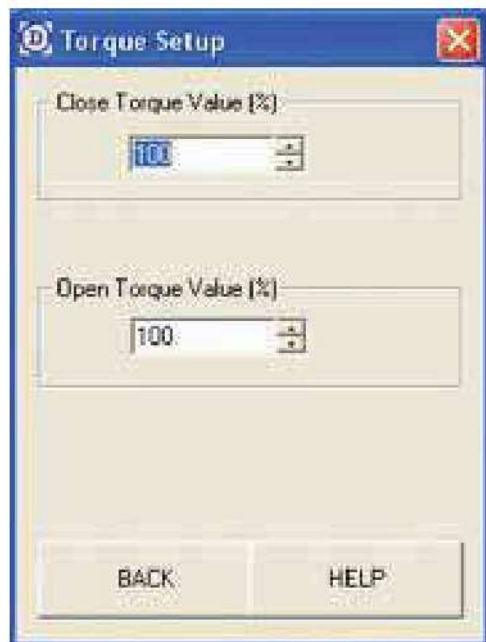
### Valve Setup

Allowed changes: CW (Clockwise to Close) or CCW (Counter Clockwise to Close), Torque or Position seating.



### Torque Setup


Allowed changes: Torque % value from 40-100% [contact Limitorque before increasing torque values as the actuators are configured for the desired torque output at the factory].



The Torque Setup dialog box has a title bar with a blue background and a red close button. It contains two input fields: "Close Torque Value (%)" with a value of 100 and "Open Torque Value (%)" with a value of 100. Both fields have up and down arrows for adjustment. At the bottom, there are two buttons: "BACK" and "HELP".

### Modutronic Setup

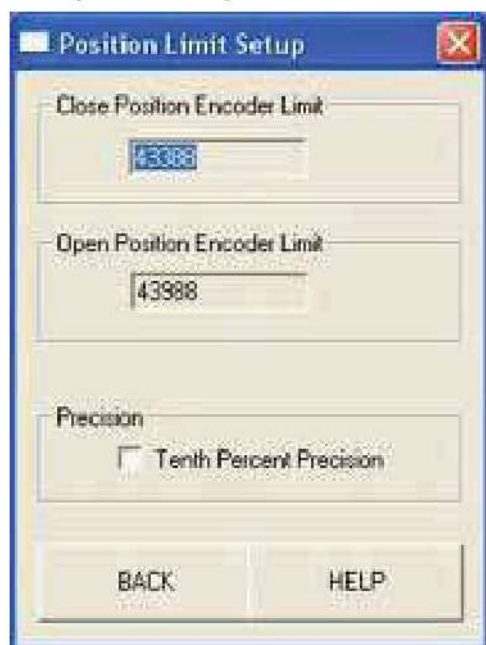
Allowed changes: Modutronic Enabled/Disabled, Proportional Band, Dead Band, Fail Action, Position, Polarity, and Delay After Stop.



The Modutronic Setup dialog box has a title bar with a blue background and a red close button. It contains several settings: "Modutronic Enabled" (unchecked checkbox), "Prop. Band %" (15), "Dead Band %" (2), "Fail Action" (POSITION), "Fail Position" (76), "Polarity: 20mA = Open" (checked checkbox), and "Delay After Stop (Sec)" (10). All numerical values have up and down arrows. At the bottom, there are two buttons: "BACK" and "HELP".

### Position Limit Setup


**Note:** Encoder values are read only. Precision parameter is the only allowed change.



The Position Limit Setup dialog box has a title bar with a blue background and a red close button. It contains three input fields: "Close Position Encoder Limit" (43988), "Open Position Encoder Limit" (43988), and "Precision" (Tenth Percent Precision). The first two fields have up and down arrows. At the bottom, there are two buttons: "BACK" and "HELP".

### Network Setup Option

Allowed changes: Refer to specific protocol documentation for detailed information. If a network option is installed, the appropriate network type will be displayed. Protocols supported: Profibus DP/PA, DeviceNet, Modbus or Not Installed.



The Network Config dialog box has a title bar with a blue background and a red close button. It contains a dropdown menu for "Select Network Board Type" with "DDC" selected. Below the dropdown is a "Configure" button. At the bottom, there are two buttons: "BACK" and "HELP".



### Status and Alarm Configuration (Relay) Option

Allowed changes: S1-S2, R1-R8 – option dependent [allows for installed relay changes involving Trigger and Action].



Relay Configuration dialog box showing tabs for S1-S2, R1-R4, and R5-R8. The S1-S2 tab is active, displaying a table with columns: Relay, Trigger, and Action.

Relay	Trigger	Action
S1	Opened	Open
S2	Opened	Close

Buttons: BACK, HELP

### Analog Out Configuration Option

Allowed changes: Function (APT, ATT, Restricted), Output (Current, Voltage), Offset (4-20ma, 0-20ma), Polarity (20ma-OPEN, 20ma\_CLOSE), Enable/Disable.



Analog Out Configuration dialog box showing tabs for Analog Out 1 and Analog Out 2. The Analog Out 1 tab is active, displaying settings for Enable, Function, Output, Offset, and Polarity.

Enable: ☐ Function: APT

Output: Current

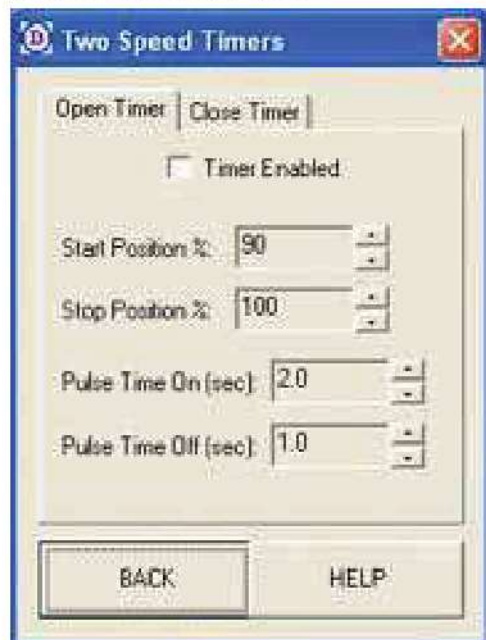
Offset: 4-20mA

Polarity: 20mA = Open

Buttons: BACK, HELP

### Two Speed Timer Configurations

Allowed changes: Timer Enabled/Disabled, Start and Stop positions (in %), Pulse Time On (max 20 sec), Pulse Time Off (max 200 sec), Open or Close.



Two Speed Timers dialog box showing tabs for Open Timer and Close Timer. The Open Timer tab is active, displaying settings for Timer Enabled, Start Position %, Stop Position %, Pulse Time On (sec), and Pulse Time Off (sec).

Open Timer | Close Timer

Timer Enabled: ☐

Start Position %: 90

Stop Position %: 100

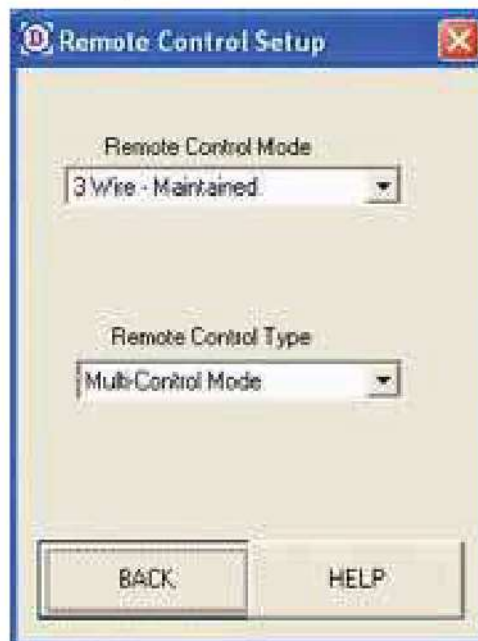
Pulse Time On (sec): 2.0

Pulse Time Off (sec): 1.0

Buttons: BACK, HELP

### Remote Control Configuration

Allowed changes: Modes; 2-wire OPEN, 2-wire CLOSE, 3-wire INCHING, 3-wire MAINTAINED, 4-wire, Remote User Input, type; Multi-Control Mode; Digital or Network or Analog control [refer to the MX/QX LMENTB2300 documentation for detailed information].



Remote Control Setup dialog box showing settings for Remote Control Mode and Remote Control Type.

Remote Control Mode: 3 Wire - Maintained

Remote Control Type: Multi-Control Mode

Buttons: BACK, HELP



### Local Control Configuration

Allowed changes: Local Control Enable, LED color reversal.



**Local Control Setup**

☒ Local Control Enable

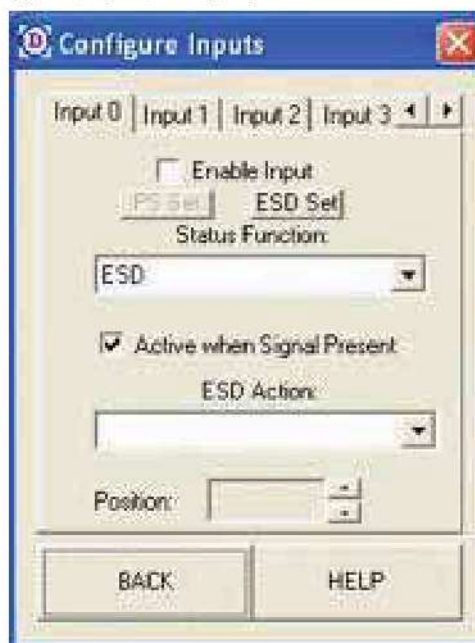
Local Control Mode  
MAINTAINED

☐ Reverse Red & Green LED

BACK HELP

### Inputs Configuration

Allowed changes: Input 0, 1, 2 (ESD, OPEN/CLOSE Inhibit, BOTH Inhibits, User Input), Input enable/disable, ESD action, ESD set (Ignore, Open, Close), Inputs 3-5 are for future implementation.



**Configure Inputs**

Input 0 | Input 1 | Input 2 | Input 3

☐ Enable Input

PS Set ESD Set

Status Function:  
ESD

☒ Active when Signal Present

ESD Action:

Position: - +

BACK HELP

### ESD (Emergency Shutdown) Overrides Configuration

Allowed changes: User selectable defining the degree of protection required when using the ESD function.



**ESD Overrides**

ESD can override the following:

- ☐ ESD Overrides Inhibit
- ☐ ESD Overrides Local Cmd
- ☒ ESD Overrides Stop
- ☐ ESD Overrides Valve Jam
- ☐ ESD Overrides Lost Phase
- ☐ ESD Overrides Overtorque
- ☐ ESD Overrides Overtemp
- ☒ ESD Overrides Two Speed
- ☐ Local ESD Overrides NW ESD

BACK HELP

### Monitor Relay Configuration

Allowed changes: Local switch position (Local, Stop), Overtorque, Inhibit, ESD, non-configurable features are THOL (over temperature), Jammed and Overtorque.



**Monitor Relay...**

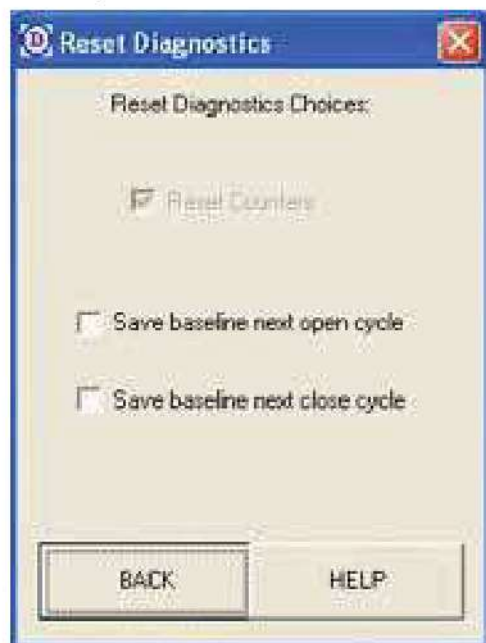
Select Monitor Relay Triggers:

- ☒ Local Selected
- ☒ Local Stop Selected
- ☐ Overtorque Active
- ☐ Inhibit Active
- ☐ ESD Active
- ☐ PS Mode Enabled
- ☐ PS Enable Fault
- ☐ ESD Release Fault

BACK HELP

### Reset Diagnostics Option

Allows for establishing a new baseline for the OPEN and CLOSE cycles.



Reset Diagnostics Choices:

☒ Reset Counters

☐ Save baseline next open cycle

☐ Save baseline next close cycle

BACK      HELP

### Password Configuration

Allowable settings: 000-999.



Set a 3 digit MXA password.  
Cancel to quit.

Password:

0 0 0

CANCEL      OK

### Unit Tag Configuration

Allowed changes: Maximum of 8 alphanumeric characters recommended.



Unit Tag:

MDV\_2278

BACK      HELP

### Torque Boost Configuration

Allowable settings: AUTO, ON or OFF. Recommended setting is AUTO.



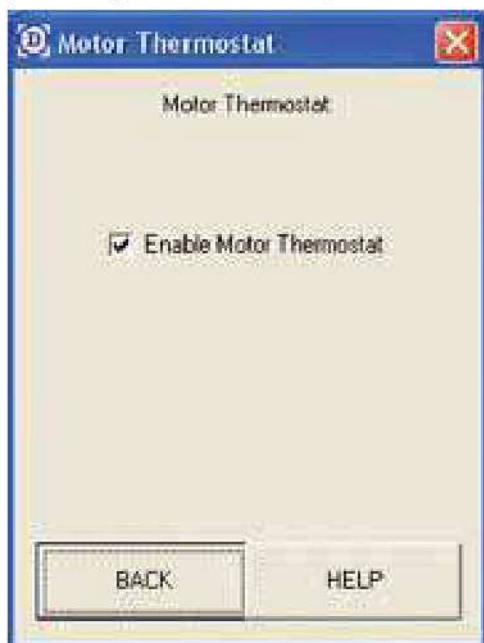
Torque Boost:

AUTO

BACK      HELP

### Motor Thermostat Configuration

Allows for enabling or disabling motor over temperature protection [recommended setting is Enable Motor Thermostat].



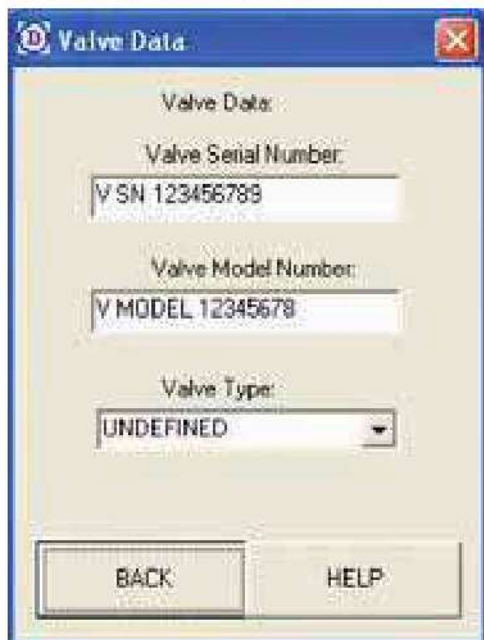
Motor Thermostat

☒ Enable Motor Thermostat

BACK HELP

### Valve Data Configuration

Allowed settings: Valve Serial Number, Valve Model Number and Valve Type (linear, rotary, other, undefined). [Valve data should be obtained from the valve manufacturer.]



Valve Data:

Valve Serial Number:  
V SN 123456789

Valve Model Number:  
V MODEL 12345678


Valve Type:  
UNDEFINED

BACK HELP

### Port Configuration

Allowed settings: IR (infrared - required for firmware download, BT-optional (Bluetooth), Disabled.

The Bluetooth option settings include BT name, password, discoverable and security option.



Port Config:

☒ Enable Local Port

Diagnostics Port:  
Bluetooth Port

Configure Bluetooth

BACK HELP



Bluetooth Config

Bluetooth Addr: 00:a0:96:1a:1a:c5

Bluetooth Name:  
☒ Use Unit Serial Number  
☐ Use Unit Tag

Bluetooth Password:  
default123456789

☒ Unit is Discoverable  
☒ Enable Security

BACK HELP

### Backup Power Configuration

If equipped with this option, the recommended setting is to enable backup, power which allows for viewing unit position information when the main power is removed.



### Language Selection

Allows for language selection [supported languages listed in the picture below].



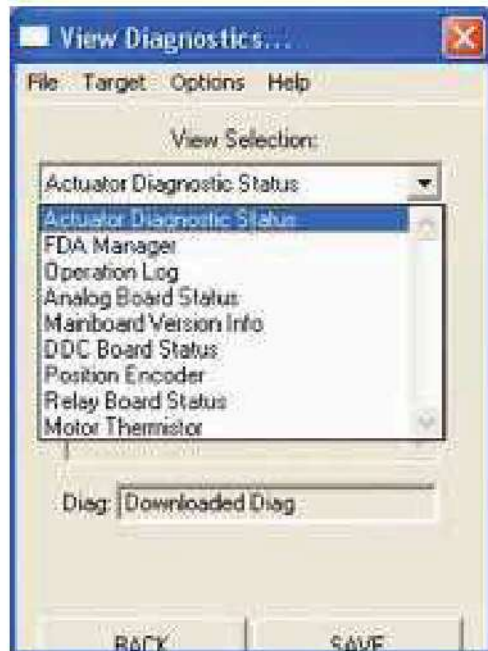
**NOTE:** To save the configuration in the Change Settings, select COMMIT.



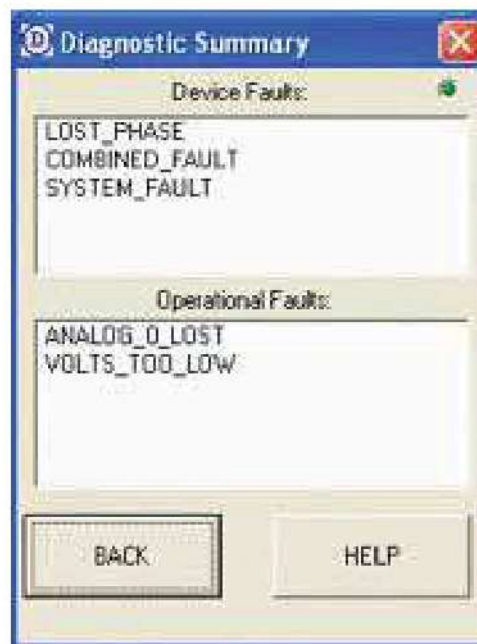
## MX/QX Diagnostics

This section describes the diagnostics available via Dashboard.

To access the diagnostics, a BT or IR Link must be established. This function is not available in the offline mode unless viewing a saved file. The “Diagnostics” page displays a drop-down menu of available data as displayed below.



Example diagnostic selections are provided as a reference below:



FDA is available on all MX/QX actuators supporting the BT option. The BT option is not necessary to obtain the FDA data. The data collection function is available via IR. Refer to the MX/QX documentation for detailed specifications.

To proceed to the FDA Manager, select VIEW from the DIAGNOSTIC Tab in the WELCOME screen. Follow the prompts. Once the file is downloaded, the FDA Manager is visible and available for data collection. To initiate the initial read, proceed to the FDA tab in the FDA Manager. **NOTE:** In the display window, "Run unit to collect needed data" operated the actuator in LOCAL or REMOTE mode in between the limits. In order to collect the valid data, the MX/QX actuator must be stroked from the OPEN to CLOSE when prompted. [Limitorque recommends obtaining the initial, first installed signature of the actuator.]



Once the FDA data capture is complete, the display will be as follows:



At this point, the FDA data is available for viewing. Limitorque recommends the captured data be saved for future reference for comparison analysis.

**NOTE:** SPEED DATA in the Speed tab is available by performing the same procedure as the FDA.

Proceed to selecting “GET FDA” and the following screen should appear:



Once the read completes, proceed with viewing the trace data. **NOTE:** The file is saved in a Limitorque proprietary format. Dashboard is the only utility available to view the data at this time. The FDA and SPEED analysis is available for data recording.

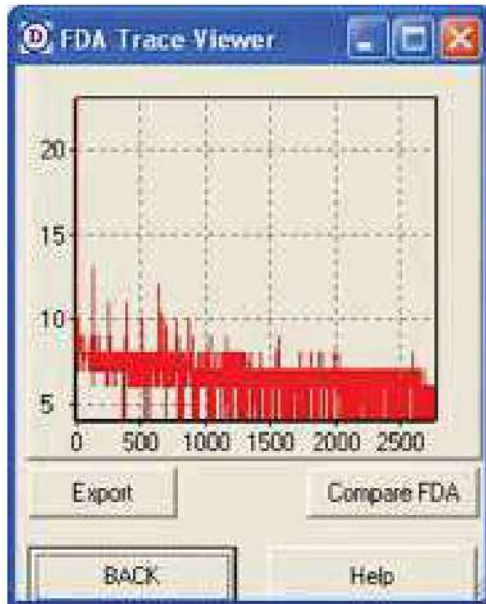




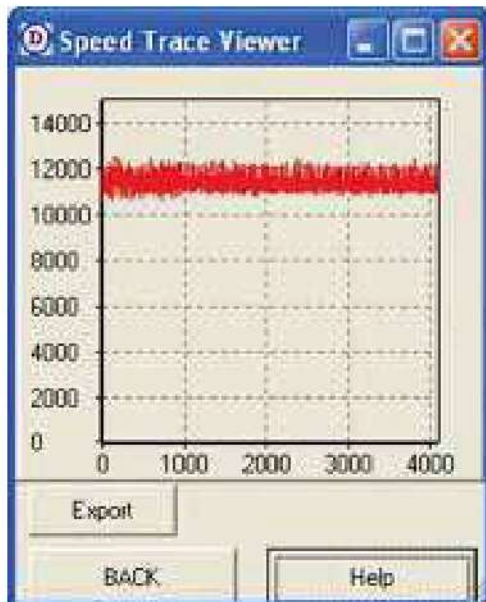
### Viewing Trace Data

Selecting View Trace Data will result in the following display presuming valid collection of data. The FDA Trace supports data comparison to an existing saved file.

#### FDA Trace



#### Speed Trace



### FDA and SPEED Analysis Explanation

The values for the X-axis are in RPM. The values for the Y-axis are the relative magnitude of the power that the various rotating components of the actuator are developing mechanically over the speed ranges. If the magnitude at any given RPM changes from the stored baseline FDA, then compare the x-axis RPM for the suspect power magnitude against the expected working RPM for the components in the actuator. Any component that is expected to operate at the suspect RPM could be at risk of excessive wear, and the actuator should be included in a targeted preventive maintenance program. The suspect parts could be ordered in advance of the preventive maintenance to ensure that the downtime will be minimized.

**Note:** At the current time, the power magnitudes are relative values.

Operation Log lists parameters associated with the MX/QX operation since the last reset. This function is a real-time log.



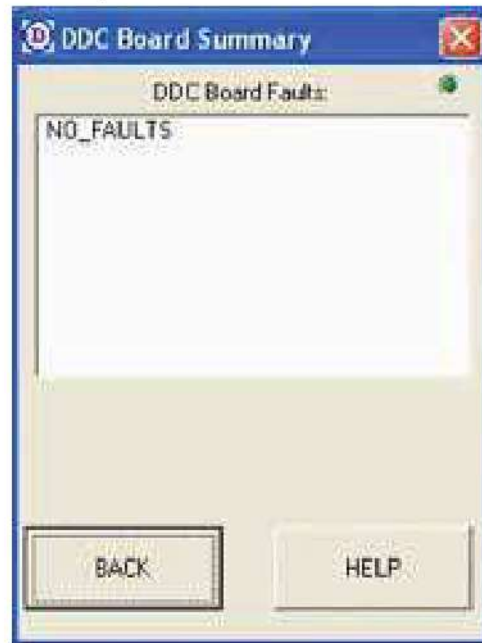
#### Analog Board Summary Status (MX/QX Option)

If optional analog boards are installed, the operational status of the boards is displayed in real time.



#### DDC Board Summary Status

If equipped with this option, the status of the Modbus board is provided.



#### Mainboard Version Display

The data display pertains to the MX/QX Main Processor Board indicating the boot, software and CPDL versions.



### Position Encoder

The MX/QX actuator utilizes a unique encoder design consisting of absolute and incremental encoders. The diagnostic data provides the real-time status of the encoder at the time of evaluation.



The Encoder diagnostic window displays the status of five encoders (Enc 1 to Enc 5). It shows the Actuator Position as a blue bar and the Position Encoder Status as 'GOOD' in a green box. The window includes 'BACK' and 'HELP' buttons.

### Motor Thermistor

This table provides real-time information since the last reset. The temperature in Therm 1 represents the present motor temperature; Therm 2 displays the highest temperature recorded during any operation.



The Motor Thermistor diagnostic window displays real-time temperature information. It shows Motor Temp (Celcius) as 37, Overtemp Fault as 'NONE' in a green box, and Thermistor Fault as 'NONE' in a green box. The Overtemp Recovery Count is 0. The window includes 'BACK' and 'HELP' buttons.

### Relay Summary Status

If optional relay board is installed in the actuator, the operational state of the board is provided. The standard relays consist of S1 and S2 relays. R1-R8 are optional.



The Relay Diagnostic Summary window displays the status of relay faults and board faults. It shows Relay Faults as 'NO\_FAULTS' and Board Faults as 'R5R8\_BOARD\_NOT\_PRESENT' and 'R1R4R6\_BOARD\_NOT\_PRESENT'. The window includes 'BACK' and 'HELP' buttons.



The Motor Thermistor diagnostic window displays the highest temperature recorded during any operation. It shows Highest Temp (Celcius) as 52. The window includes 'BACK' and 'HELP' buttons.

## Additional Utilities

The Dashboard is provided with two utilities that allow for the MX/QX firmware update and detailed troubleshooting. The utilities consist of the MX/QX Downloader and the Modsim (Modbus Simulator) software for easy troubleshooting.

An additional mode (Engineering) is provided for Limatorque personnel only.

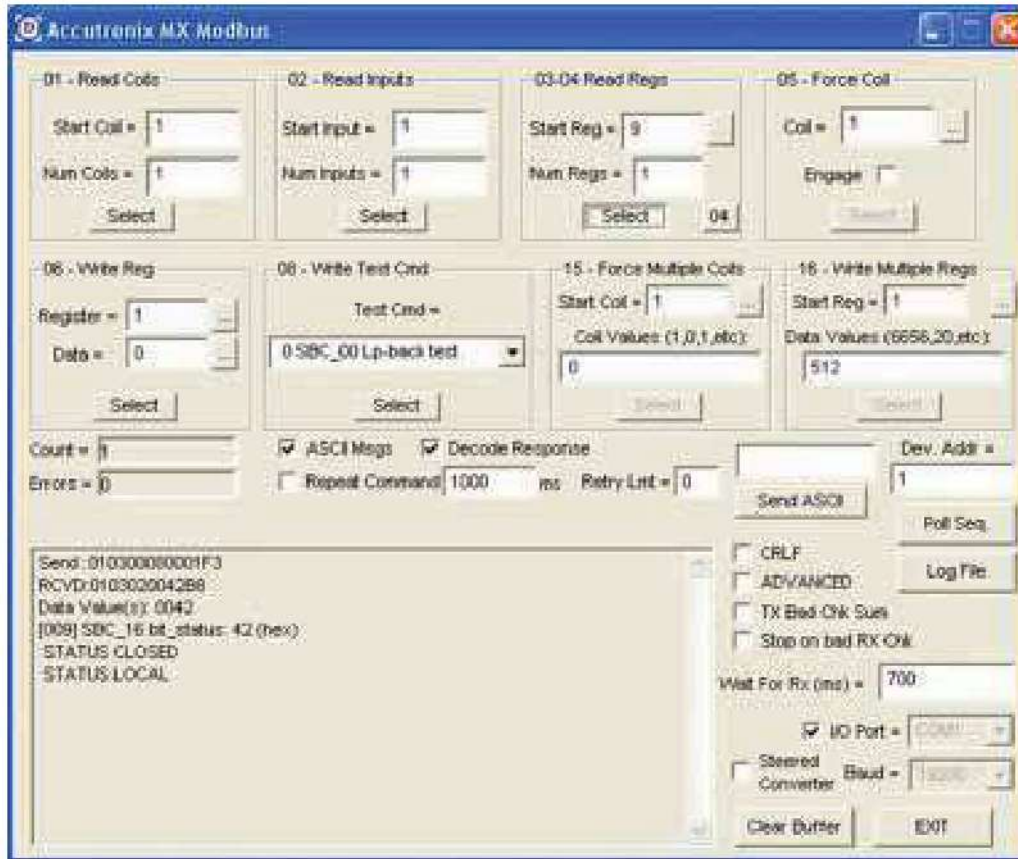
### MX/QX Downloader

The MX/QX Downloader is available only when using the IR option. The downloader can be used for the SMT (non-BT-compatible MX/QX) and the BT-compatible MX/QX's. For use with the BT-compatible MX/QX, the "Default bps" must be checked; for SMT, do not check the "Default bps."



Please change this view to display the latest version of the MXa.

The Modsim utility allows for internal diagnostics of the MX/QX actuator. This option can be used with BT (if equipped) or the standard IR port. The Modsim utility is compatible with the SMT (non-BT-compatible MX/QX) or the BT-compatible MX/QX.



For detailed register information, refer to the MX/QX Modbus Manual LMENIM2329-00. If additional support is required, please contact Limitorque service at 434-528-4400.



## Troubleshooting

This section details troubleshooting information associated with Dashboard to the MX/QX communication.

### Link Lost Error

This message is displayed if the MX/QX is reset, IR is out of range for more than five seconds, or the BT is out of range.

NOTE: Variable Frequency Drives interfere with the IR connection, resulting in a “Link Lost” message if already connected.



### Request Denied

This error is observed when the connection is terminated by the user clicking the RESET function. The link must be established for additional MX/QX diagnostics to continue.



## *Supporting Documentation*

LMENIM2306 – MX Installation and Operation Manual

LMENIM4019 – Direct to Host Manual

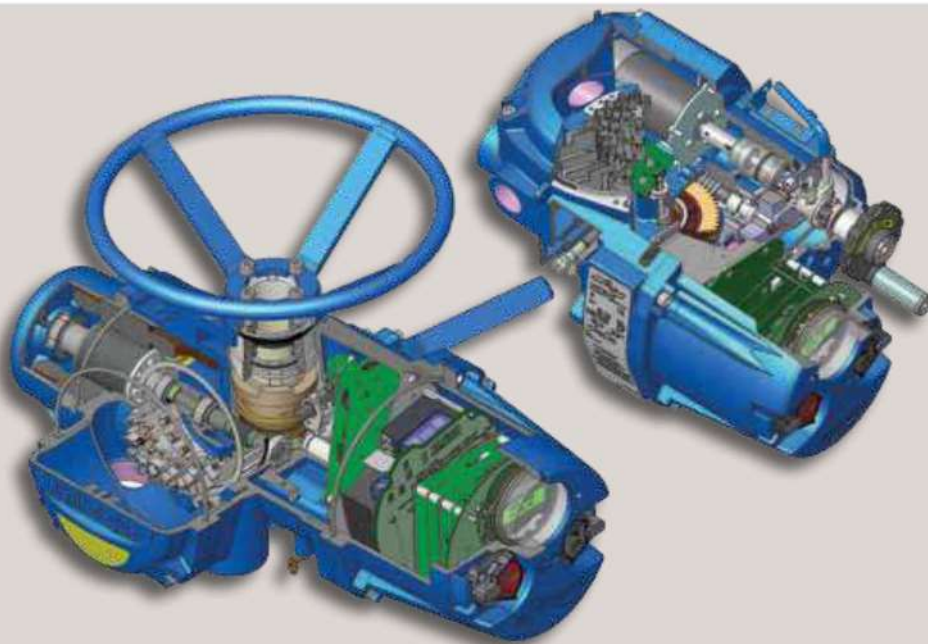
LMENBR2300-00 – Technical Bulletin, Protection/Control/  
Monitoring Features

LMENIM2329-00 – MX DDC Manual (register detailed  
description)

LMENIM3306-00 – QX Instruction and Operation Manual

For additional documentation, go to [www.limitorque.com](http://www.limitorque.com)  
and type “MX” and or “QX” in the Search window.

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