M3000 to M4000 Upgrade

Installation Guide

QT Petroleum on Demand

(QTpod)

Version 1.0

Date: June 30, 2020

Call QT Petroleum on Demand for any pre-existing pump issues (Will not go into fast flow, will not shut off at the preset amount, cannot turn pump motor on, etc.)

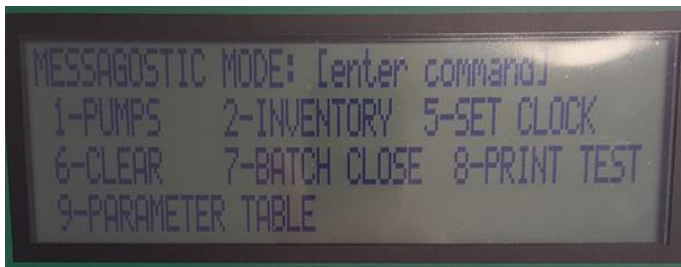## Call QT Petroleum on Demand 2 weeks before removal to verify setup (network, pump configuration, etc.)

303-444-3590; Option 3

Prep M3000 for removal

Force batch close: This is to ensure there are no unsettled transactions in the M3000

From the terminal

1. Turn the Diagnostic switch
2. Press 7 -1
3. Verify BATCH CLOSE DONE or BATCH CLOSE UNNECESSARY
4. If done at terminal, turn off Diagnostics

Retrieve/Print sales;

From Siteminder click on communications – Retrieve Sales from Terminal

Caution

Many of the M3000 units were installed with a 30 amp mechanical contactor relay in the pedestal. This was used to isolate the M3000 from 120 or 240 VAC running to the pump motor. If you are using these old contactor relays inside your M3000, they can create electrical interference in the M4000 and the functionality of Relay Module PC board. We recommend replacing them in the M4000 with new solid-state relays that we can provide for an additional fee.

Example: 30amp contactor relay

Example: Solid State relay
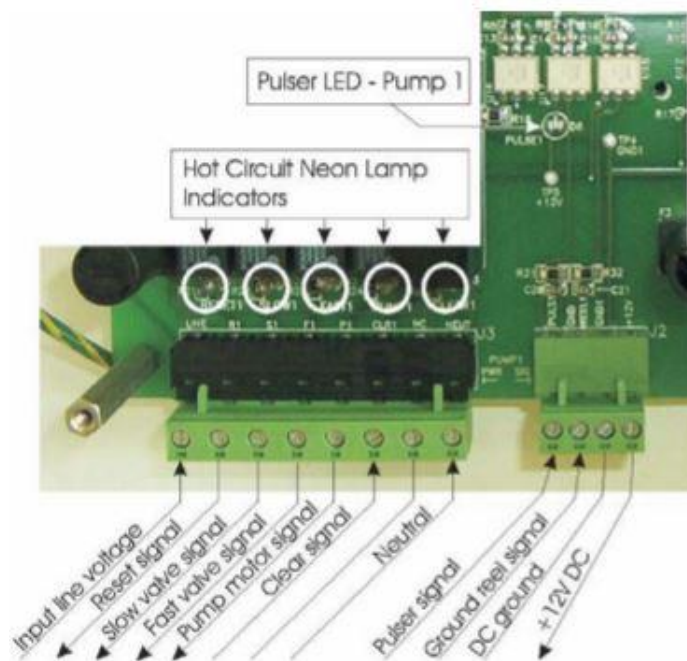
Reason for the Solid-State Contactors (Relays)

The high voltage and current arcing on any optionally installed standard coil relays can cause problems. The M4000 outputs a 120VAC pump power signal on pin 5. The output can only supply a maximum of 2 Amps and pump motors typically require more current than that. The solution is to install a contactor (high-voltage relay) between the relay module and the motor. The output of the relay module controls the contactor(relay), and then the output of the contactor powers the motor from a high current capable source circuit. **Note that this high current circuit will need its own over-current circuit protection, as it is not maintained by the protection circuitry of the M4000.**

The location of the contactor/relay could either be at the site's circuit breaker panel or within the pedestal of the M4000. The M4000 has a metal DIN rail running directly below the Direct Pump Interface's relay modules. The standardized shape of the DIN rail allows a convenient mounting method for various components.

Before removing wires from M3000

For ease of installation of the M4000, it is important to label all wires in the pedestal of the M3000 before removing them from the pump control board (DPI Board). The DPI board on the M3000 has the same input/outputs as those on the DPI relay module board(s) of the M4000, so marking the wires (Line 1, Reset 1, Slow 1, Fast 1, Pump 1, Clear 1, Neutral 1, etc.) will save time when installing the M4000. Note that some systems may have atypical wiring in which not all input/outputs on the M3000 have wires to them, for instance on systems without a two-stage solenoid valve. In either case, the wiring from the M3000 should match that of the M4000. Below is an illustration of the M3000. It can also be helpful to take pictures of wiring in pedestal at different angles for later reference.
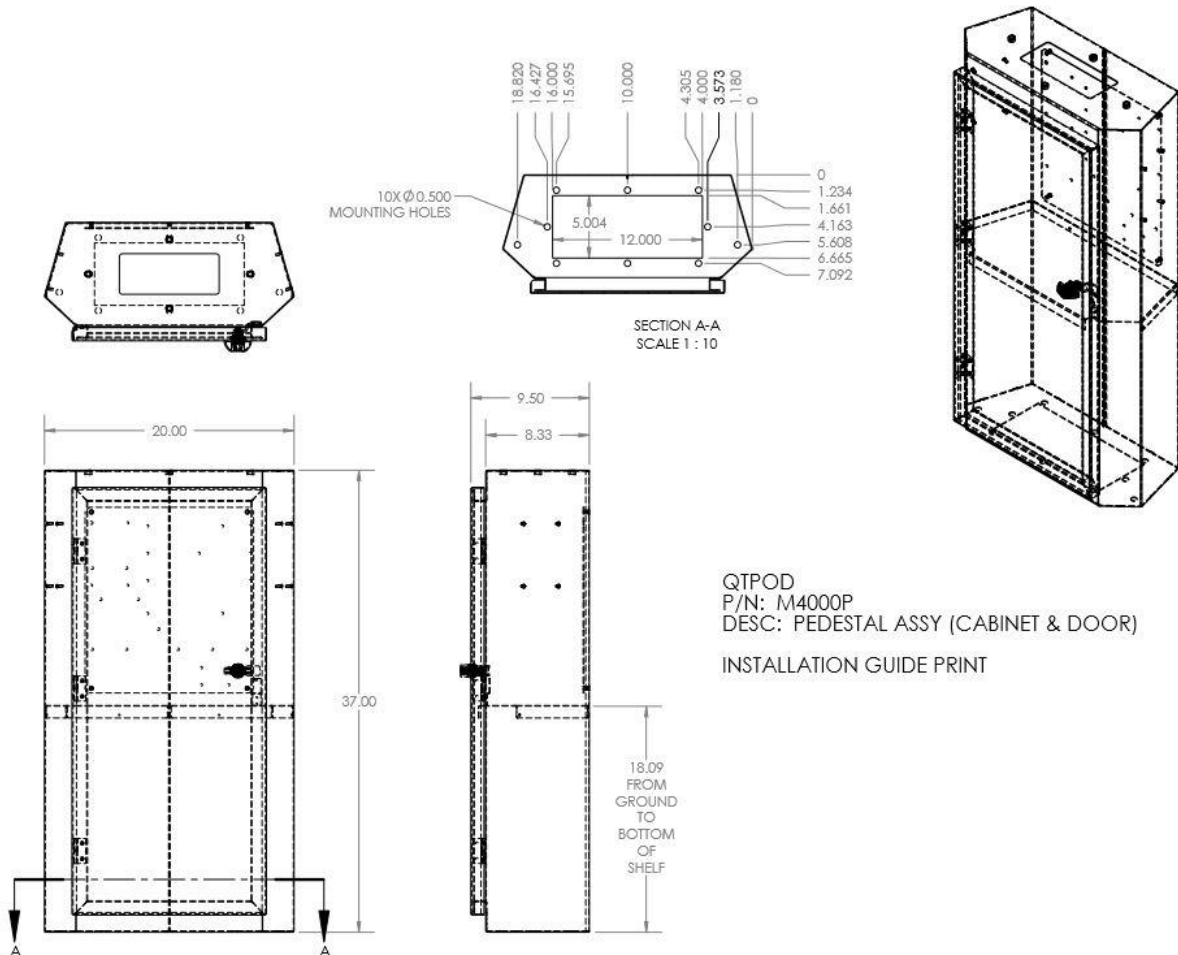
Remove the M3000.

Example: M3000 Pedestal Wiring

M4000 Pedestal Installation

When preparing to install the pedestal section of the M4000 it is important to ensure there is adequate space as the M4000 system is wider than the M3000. The below diagram illustrates the dimensions of the M4000 pedestal.

The bolt pattern on the baseplate of the M4000 matches that of the M3000 except that the M4000 has two additional holes on the outer periphery of the baseplate. We recommend sinking two additional bolts for these holes for maximum stability as the M4000 is taller and heavier than the M3000.

While the width of the M4000 is greater than on the M3000, the opening for conduits on the baseplate has the same dimensions as those on the M3000. Therefore, the conduit used on the M3000 should fit into the opening on the M4000. It should be noted that we see the M3000 units installed in a variety of ways. Therefore, there may be instances in which the conduit needs to run into the back of the M4000. This is acceptable as long as it is below the 18" shelf in the pedestal. It is not recommended to run conduit into the side of the M4000 as it is angled and may prevent proper sealing. If you have one of our larger, hybrid pedestals for your M3000, please call technical support for recommendations.

SECTION A-A
SCALE 1 : 10

10X Ø 0.500
MOUNTING HOLES

QTPOD
P/N: M4000P
DESC: PEDESTAL ASSY (CABINET & DOOR)

INSTALLATION GUIDE PRINT

18.09
FROM
GROUND
TO
BOTTOM
OF
SHELF

In order to get the conduit through the 18" shelf in the pedestal shelf, you will need to drill holes in the same pattern as on the shelf in the M3000 pedestal. The easiest way many installers have found to do this is to use paper to trace the hole pattern on the M3000 shelf and use this as a template for hole placement on the M4000 shelf.

Remember, the M4000 cabinet is stainless steel, so you will need stainless steel bits for drilling the holes.

Mounting the M4000 Head

Once the pedestal has been firmly mounted, the Terminal Head can be installed.

NOTE: It is important that all power is turned off inside the pedestal while working on assembly tasks.

Use the four 3/8 bolts and washers packaged in Printer box to attach the Terminal head unit to the top of the Pedestal. Tighten bolts well enough to compress the gasket between the top and bottom sections to form a weather-Resistant seal.

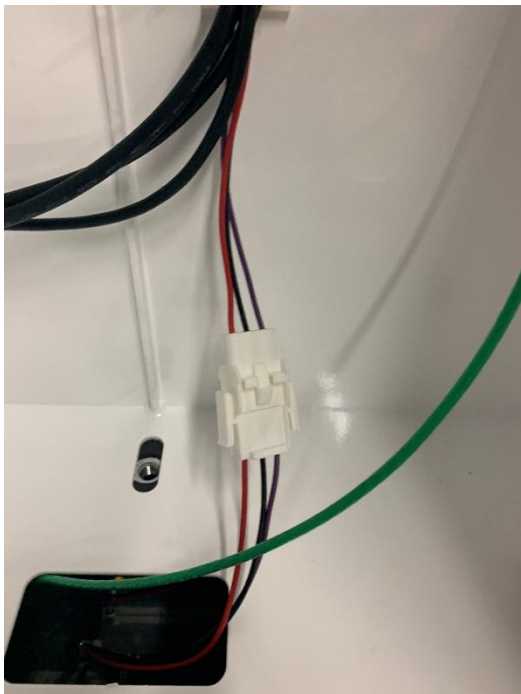<div style="border:2px solid black;padding:1em;">

WARNING

Never attempt to commission the QTpod M4000 in inclement weather without some sort of utility shelter that completely protects all electronic components from moisture or contamination. The Limited Warranty does not cover damages suffered because of improper startup procedures.

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Refer to accompanying diagrams while performing the following tasks. In most cases, the cables for each peripheral device are already connected at the factory. The following set of tasks need to be accomplished prior to performing the Operational Check.

Upper M4000 Component Wiring

Moxa computer controls the card reader and printer trough USB interface. DPI interfaces with Moxa computer via a serial connection. The power and grounding to the Moxa is established through the white 3 pin connector clips and the green grounding wire from the pedestal (below). Make sure the Green wire is secured in the grounding lugs.

Connect DB9 cable from DPI MB to the rear plug of the Moxa unit. (Figure 13)

M4000 DPI Wiring

MOUNT THE PRINTER & INSTALLING PAPER

The printer is supplied in a separate box for safe transport. There are two blue retainers you pull out, to allow the printer to slide down into the mount. Pressing the retainers back locks the printer securely to the
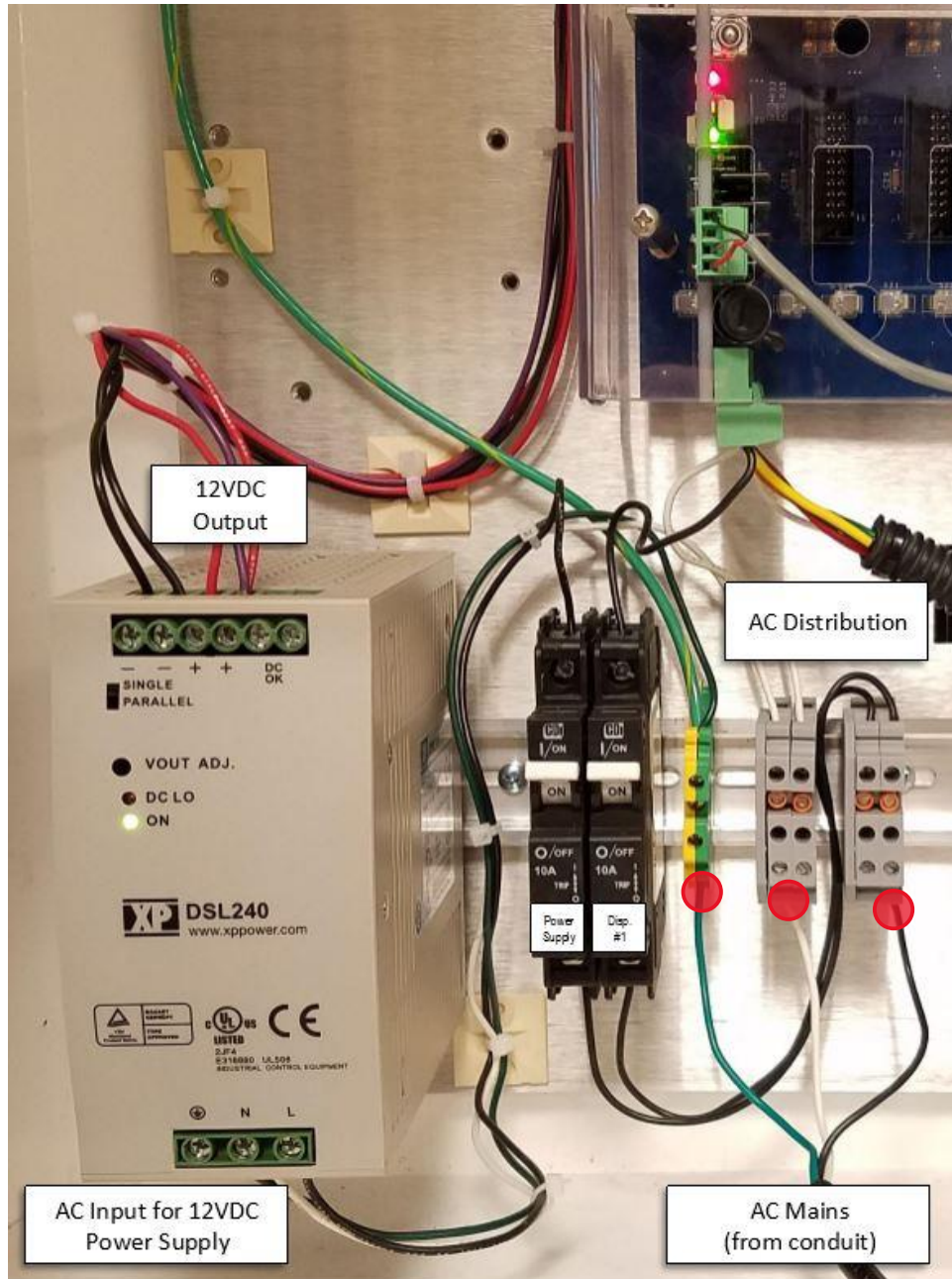Terminal's front door. Power (Blue arrow) and USB connection (Red arrow) can then be made (see Figure 14).

Printer paper feeds from a spool that is placed in the holder just below the thermal printer. To install the paper: with power applied to the printer (should be a red LED blinking on its internal board), insert the paper into the slot marked on the back of the printer. The paper should automatically be fed, and a test printout generated
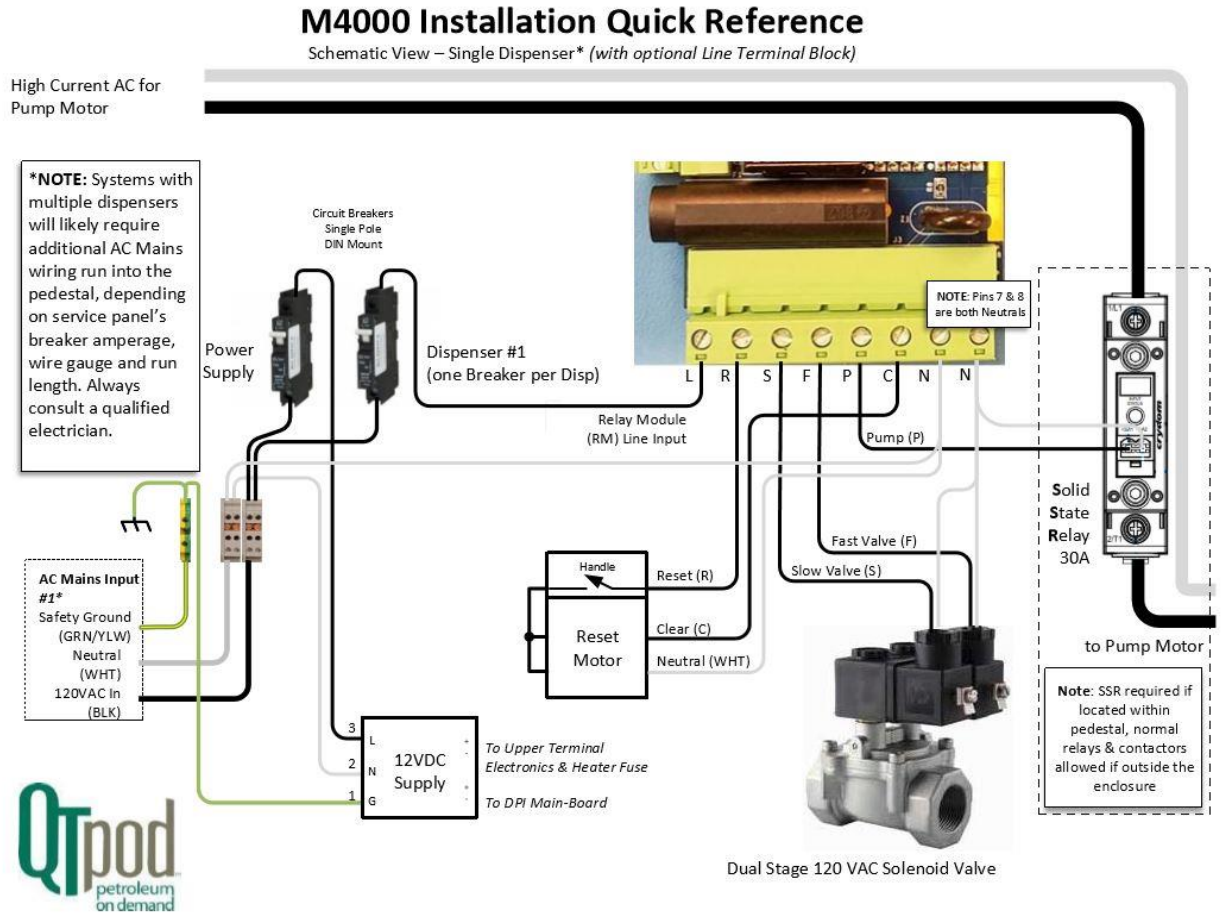
Wiring up the Pedestal

With the power off, it is time to rewire the M4000 pedestal with the wires marked earlier.

The M4000 comes with the AC lines for the DPI relay modules and DC power supply pre-wired. You simply need to run the main line's power, neutral and ground into the pedestal contactor blocks as indicated in the photo below:

The remainder of the labeled pump control wires connect to their corresponding inputs/outputs on each DPI RM board. Below is a Quick Reference Wiring Guide for reference on correct pedestal wiring.

M4000 Installation Quick Reference
Schematic View – Single Dispenser* *(with optional Line Terminal Block)*

High Current AC for Pump Motor

*NOTE: Systems with multiple dispensers will likely require additional AC Mains wiring run into the pedestal, depending on service panel's breaker amperage, wire gauge and run length. Always consult a qualified electrician.

Circuit Breakers
Single Pole
DIN Mount

Power Supply

Dispenser #1
(one Breaker per Disp)

Relay Module
(RM) Line Input

NOTE: Pins 7 & 8 are both Neutrals

L R S F P C N N

Pump (P)

Solid State Relay 30A

Fast Valve (F)

Slow Valve (S)

Handle

Reset (R)

Clear (C)

Neutral (WHT)

Reset Motor

to Pump Motor

Note: SSR required if located within pedestal, normal relays & contactors allowed if outside the enclosure

AC Mains Input #1*
Safety Ground (GRN/YLW)
Neutral (WHT)
120VAC In (BLK)

3 L
2 N   12VDC Supply
1 G

To Upper Terminal Electronics & Heater Fuse

To DPI Main-Board

QTpod
petroleum on demand

Dual Stage 120 VAC Solenoid Valve

Once wiring is complete, you may turn on the system by activating the breakers in the M4000 pedestal, after the main breaker has been turned on.

Ideally, you will want to measure current levels on the inputs/outputs on the DPI relay module.

1. Using a direct reading AC Amp meter measure between Line and each output
   a. Reset – Turn pump switch on and watch amperage as Reset motors runs
   b. Slow
   c. Fast
   d. Pump

Each value should be below 2 Amps.

Run Diagnostic Manual Mode test

Swipe Diagnostics card to access diagnostics.
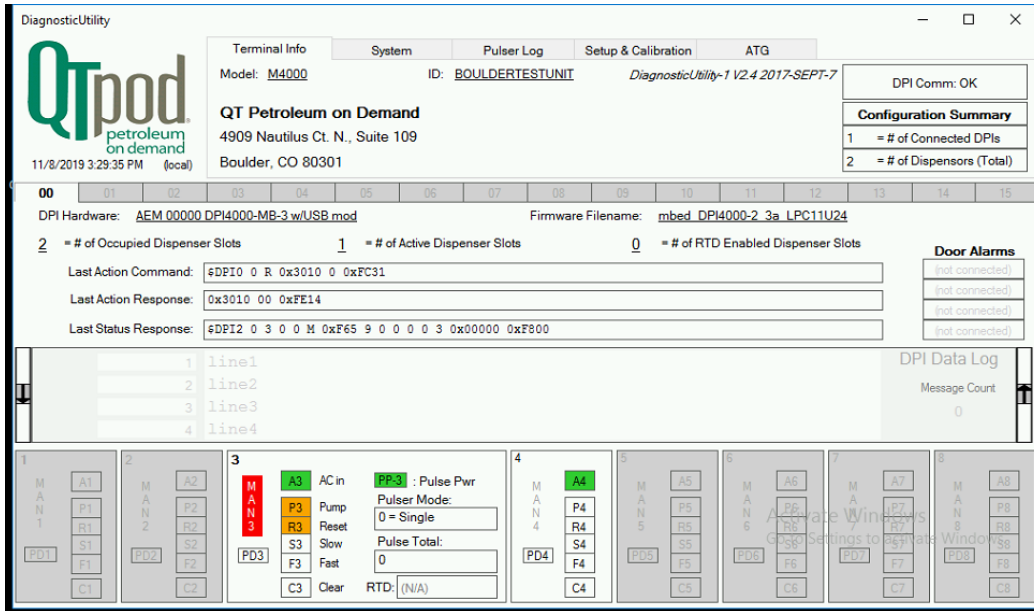

Manual Mode – Manual Button set

Verify manual mode operation

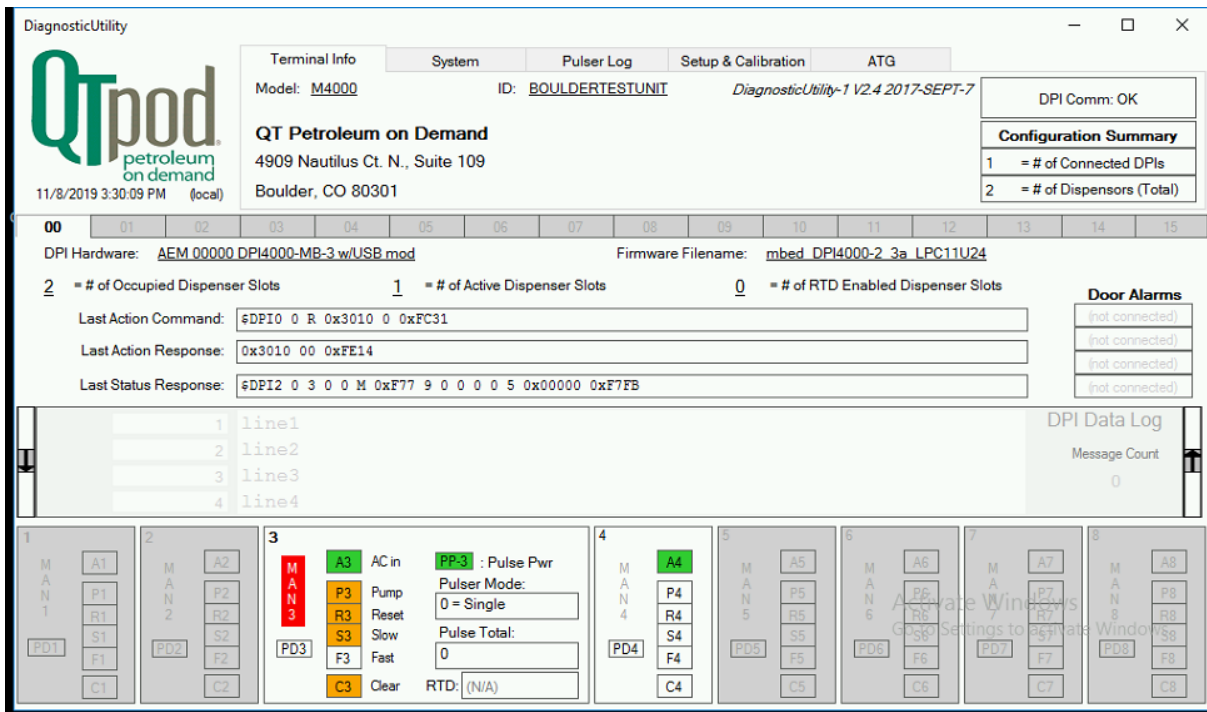Auto mode, Green LED is on solid. Red LED is flashing.

Press Manual mode button on RM board.

Green LED will blink. Red LED will come on solid.

Place each dispenser in manual mode and verify operation and pulse count.

Manual Mode – Pump Switch on

Manual Mode – Initial Slow Pulse count showing up

Manual Mode – Fast valve opened

Manual Mode – 100 Pulses pumped

First screenshot

DiagnosticUtility

Terminal Info | System | Pulser Log | Setup & Calibration | ATG

Model: M4000   ID: BOULDERTESTUNIT   DiagnosticUtility-1 V2.4 2017-SEPT-7

DPI Comm: OK

QT pod petroleum on demand

QT Petroleum on Demand
4909 Nautilus Ct. N., Suite 109
Boulder, CO 80301

11/8/2019 3:31:23 PM (local)

Configuration Summary
1 = # of Connected DPIs
2 = # of Dispensors (Total)

00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15

DPI Hardware: AEM 00000 DPI4000-MB-3 w/USB mod   Firmware Filename: mbed_DPI4000-2_3a_LPC11U24

2 = # of Occupied Dispenser Slots   1 = # of Active Dispenser Slots   0 = # of RTD Enabled Dispenser Slots

Door Alarms

Last Action Command: $DPI0 0 R 0x3010 0 0xFC31

Last Action Response: 0x3010 00 0xFE14

Last Status Response: $DPI2 0 3 100 0 M 0xF7F 9 0 0 100 0 6 0x00000 0xF729

(not connected)
(not connected)
(not connected)

1 line1
2 line2
3 line3
4 line4

DPI Data Log
Message Count
0

3 A3 AC in   PP-3 : Pulse Pwr
MAN3   P3 Pump   Pulser Mode:
R3 Reset   0 = Single
S3 Slow   Pulse Total:
PD3   F3 Fast   100
C3 Clear   RTD: (N/A)

4 A4
MAN4   P4
R4
S4
PD4   F4
C4

Manual Mode – Manual Mode completed

Second screenshot

DiagnosticUtility

Terminal Info | System | Pulser Log | Setup & Calibration | ATG

Model: M4000   ID: BOULDERTESTUNIT   DiagnosticUtility-1 V2.4 2017-SEPT-7

DPI Comm: OK

QT pod petroleum on demand

QT Petroleum on Demand
4909 Nautilus Ct. N., Suite 109
Boulder, CO 80301

11/8/2019 3:31:36 PM (local)

Configuration Summary
1 = # of Connected DPIs
2 = # of Dispensors (Total)

00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15

DPI Hardware: AEM 00000 DPI4000-MB-3 w/USB mod   Firmware Filename: mbed_DPI4000-2_3a_LPC11U24

2 = # of Occupied Dispenser Slots   0 = # of Active Dispenser Slots   0 = # of RTD Enabled Dispenser Slots

Door Alarms

Last Action Command: $DPI0 0 R 0x3010 0 0xFC31

Last Action Response: 0x3010 01 0xFE13

Last Status Response: $DPI2 0 3 0 0 A 0xF41 9 0 0 100 0 0 0x00000 0xF7B4

(not connected)
(not connected)
(not connected)

1 0x0123943C: 1 0 3 0 100 - Manual-Mode completed
2 line2
3 line3
4 line4

DPI Data Log
Message Count
1

3 A3 AC in   PP-3 : Pulse Pwr
MAN3   P3 Pump   Pulser Mode:
R3 Reset   0 = Single
S3 Slow   Pulse Total:
PD3   F3 Fast   100
C3 Clear   RTD: (N/A)

4 A4
MAN4   P4
R4
S4
PD4   F4
C4

Contact QTPod to Activate terminal

Run Private card Test Sale

1. Restart the M4000 to go back into site application.
2. Swipe a test card and select gallon amount.
3. Ask for at least 2 gallons and verify shut off at that amount for each dispenser.
4. Confirm that M4000 receipt matches meter register.
5. Press okay and pump fuel. Contact QTPod if adjustments are required

Test for credit card approval

1. Ask for $2 and verify approval. You do not have to pump fuel. Just turn pump switch on, allow dispenser to reset and turn pump switch off.

Get online and access Siteminder.

1. Adjust fuel prices as necessary. (refer to Siteminder Manual)
2. Modify messages to your situation. (refer to SIteminder Manual)