

BIG ALEC V Fluid Inventory Control System (2003, 2003-P2)

Installation and Operation Manual (2003-INST)



1 Specifications

1.1 ***BIG ALEC V System***

- 2003 (one product system)
 - Capable of delivering one product to one Station.
 - Order one, TIM-2000-1 Add-On Station Kit for each additional Station required. Total of 12 Stations max.
- 2003-P2 (two product system)
 - Capable of delivering the first product to one Station and a second product to one Station (two different products, one Station each).
 - Order one, TIM-2000-1 Add-On Station Kit for each additional Station required.
 - First product, six stations max.
 - Second product, six stations max.
- Thermal Relief (***REQUIRED***):
 - 1:1 ratio diaphragm pumps use, TIM-RELIEF-KIT (100 P.S.I.)
 - 3:1 ratio pumps and 4:1 ratio pumps use TIM-2000-4 (600 P.S.I.)
 - 5:1 ratio pumps use, TIM-2000-4 (600 P.S.I.)
 - 9:1 ratio pumps use, TIM-2000-4A (900 P.S.I.)

1.2 ***Power Supply (2000-24AC)***

- Input: 120 VAC, 60 Hz, 70 VA
- Output: 24 VAC, 2500 mA
- Cable length: approximately 10' end-to-end

1.3 ***CAT5 Cable (2003-14CAT)***

- Industry-standard CAT5 cable, 14' end-to-end length.

1.4 ***Touchscreen (2003-CON)***

- Physical
 - Mechanical: 6.1 inches H, 9.3 inches L, 2.0 inches D, 1.55 pounds
 - Operating temperature: -10°C to +55°C non-condensing
 - Storage temperature: -20°C to +70°C
 - Wall Mount Hole Pattern: 7.0" Wide. Screw head diameter less than 3/8".
- Passwords
 - Technician – up to 10 technician passwords can be assigned. The Technician password must be entered in order to dispense product. The technician password appears along each product delivery in the history log. Optionally, the Administrator can disable the requirement to enter a technician password before dispensing product.
 - Administrator – unlocks the Setup menu for changing flow meter calibration, assigning product names, technician passwords, etc. Initial factory setting: **25325**

- Product(s) versus Stations:
 - 1 x 12 (Product 1 to Stations 1-12; order item: 2003)
 - 2 x 6 (Product 1, Stations 1-6; Product 2, Stations 1-6; order item: 2003-P2)
- Clock: real time clock for time/date stamped transactions.
- USB 2.0 ports
 - Two each, USB A-Type connector - Female
 - Use memory stick to download the transaction log or update software.
- Serial (RS-232) ports
 - Two each, DB9M – Male, for printer e.g., Epson TM-T88V Thermal Printer
 - Use Serial 1 port for printing (Must also connect USB1 port to Thermal Printer)
 - Use straight-through, 9-pin RS-232 cable and a 9-pin to 25-pin adapter or a straight-through 9-pin to 25-pin cable.
- Expander ports
 - Two each, CAT5 connector – Female,
 - For communication between Touchscreen and Expander
- Power:
 - 24VAC, Fuse: 3AG 0.3A slow blow fuse
- Product:
 - Factory preset or Administrator defined description, e.g., Synthetic Oil 0W-20
 - Configurable for One Product (Figure 1) or Two Products (Figure 2).

Figure 1, One Expander, One Product

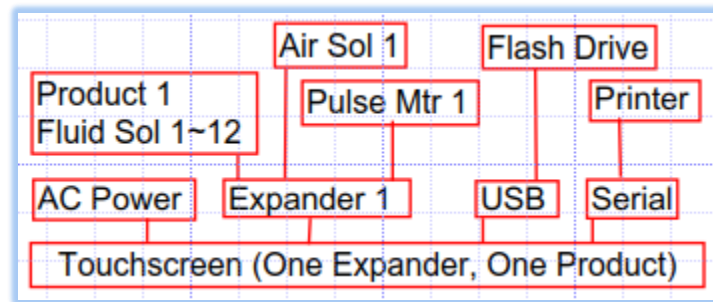
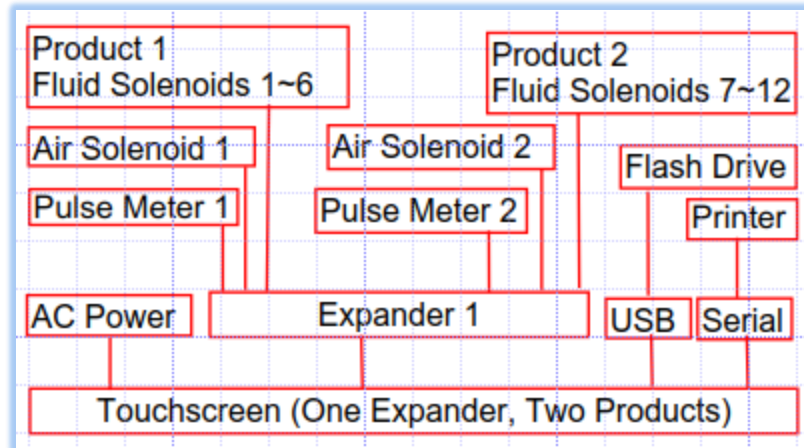


Figure 2, One Expander, Two Products



1.5 **Expander (2003-BOX)**

- Physical
 - Mechanical: 4.5 inches (113 mm) W, 6.5 inches (153 mm) L, 5 oz. (140 g)
 - Operating temperature: -10°C to +55°C non-condensing
 - Storage temperature: -20°C to +70°C
 - Wall Mount Hole Pattern: 3.5" Wide. Screw head diameter less than 3/8".
- Electrical
 - Communications interface: CAT5 cable
 - Fuse: 3AG 2A slow blow fuse
 - Power: 24VAC (optional if CAT5 ≤50'; required if CAT5 >50').
 - "FLOW METER" Terminals
 - Input for Pulse Meter signal
 - FLOW Meter 1 and FLOW METER 2 (four terminals)
 - Fluid Solenoid Valve Terminals (1~12 and "VALVE COMMON")
 - Output for Fluid solenoid. Fluid Solenoid Valve is normally closed, application of 24VAC energizes the solenoid and opens the fluid passage
 - 12 "Valve Common" and 12 corresponding 24VAC terminals (24 total)
 - Control (ON/OFF): Fluid Solenoid Valve and Ready Light
 - "AIR" Terminals
 - Output for Air Solenoid. Air Solenoid Valve is normally closed, application of 24VAC energizes the solenoid and opens the air passage
 - AIR1 and AIR2 (24VAC feed) and two corresponding Common terminals



- Indicators
 - Flow In
 - Continuous red light when pulse meter is detected.
 - Light is OFF when disconnected from Pulse Meter.

- Status
 - Blinking red light when Fluid solenoid is energized (dispensing).
 - Light is OFF when Fluid solenoid Valve is de-energized.
- Link
 - Continuous red light when connected to an Expander.
 - Light is OFF when disconnected from an Expander.

1.6 **Pulse Meter**

- TIM-2000-5 (standard issue when ordering the 2003 or 2003-P2)
 - ½" NPT (F), 1000 P.S.I. maximum working pressure, Fluid flow is *not* directional.
 - Electrical: Voltage 28V, Current 100 mA, Load 3W, (two wire, non-polarized)
 - 378 pulses per gallon (Pulses *are* open/short, resistive pulses)
 - **Not compatible** with antifreeze mixtures.

Warning: To prevent cracking of the aluminum pulse meter body, put wrench on the Pulse Meter fitting. For stress relief, connect one side of the pulse meter via a rubber hose.

- TIM-365-5S (Optional)
 - ½" NPT (F), 1000 P.S.I. maximum working pressure, Fluid flow is *not* directional.
 - Electrical: Two, non-polarized pigtail wires
 - 40 pulses per gallon (Pulses *are* open/short, resistive pulses)
 - **Compatible** with antifreeze mixtures. Use Copper tubing for antifreeze.

1.7 **Fluid Solenoid Valve (TIM-2000-37)**

- Compatible: Antifreeze Mixtures, ATF, Gear Oil, Hydraulic Oil, Motor Oil, Synthetic Oil
- ½" NPT (F), 3000 P.S.I. maximum working pressure, Fluid flow *is* directional.
- 24VAC (two wire, non-polarized), Gets warm to the touch when energized.

1.8 **Ready Light (TIM-2000-36)**

- 24VAC, Red light (two pigtail wires, non-polarized)

1.9 **Air Solenoid Valve**

- TIM-2000-2
 - ¼" NPT (F), 145 P.S.I. maximum working pressure
 - 24VAC, 10W (two wire, non-polarized), Gets warm to the touch when energized.
- TIM-2000-2A
 - 1/2" NPT (F), 145 P.S.I. maximum working pressure
 - 24VAC, 10W (two wire, non-polarized), Gets warm to the touch when energized.

1.10 **Tubing, hoses, reels, control handles**

Select system components compatible with pump working pressure and local requirements.

2 Installation Instructions

2.1 *Mounting Locations*

The Touchscreen comes with rubber feet for desktop mounting and also has "keyholes" in the back for wall mounting. Consider the AC Power Supply and the Expander mounting locations.

Warning: The mounting screws must not protrude more than ¼" from the wall when wall mounting the Touchscreen or the Expander. Exceeding this measurement may cause damage.

Note: Expanders are designed to be hidden out of the way in ceilings or other remote locations. For CAT5 cable lengths greater than 50', the Expander must have its own power supply.

2.2 *Fluid Solenoid Valve and Ready Light Installation and Wiring*

Place the Fluid Solenoid Valve as close as possible to the dispensing reel or the oil bar. Mount the Ready Light where it can be easily seen by the operator, e.g., reel support bracket.

Splice one Ready Light wire to one of the Fluid Solenoid wires. Splice the other Ready Light wire to the other Fluid Solenoid Valve wire (Figure 3). Run each spliced wire to the Expander and connect one spliced wire into a Valve terminal (labeled 1-12) and the other spliced wire into a valve common terminal (labeled VALVE COMMON).

Warning: Attach only one Fluid Solenoid Valve/Ready Light per valve terminal. Attaching multiple Solenoid Valves to a single valve terminal will permanently damage the Expander.

Note: The Fluid Solenoid Valve inlet port is depicted as "2 inlet" in the picture below. The valve is directional.

Figure 3 Fluid Solenoid Valve and Ready Light Wiring Diagram

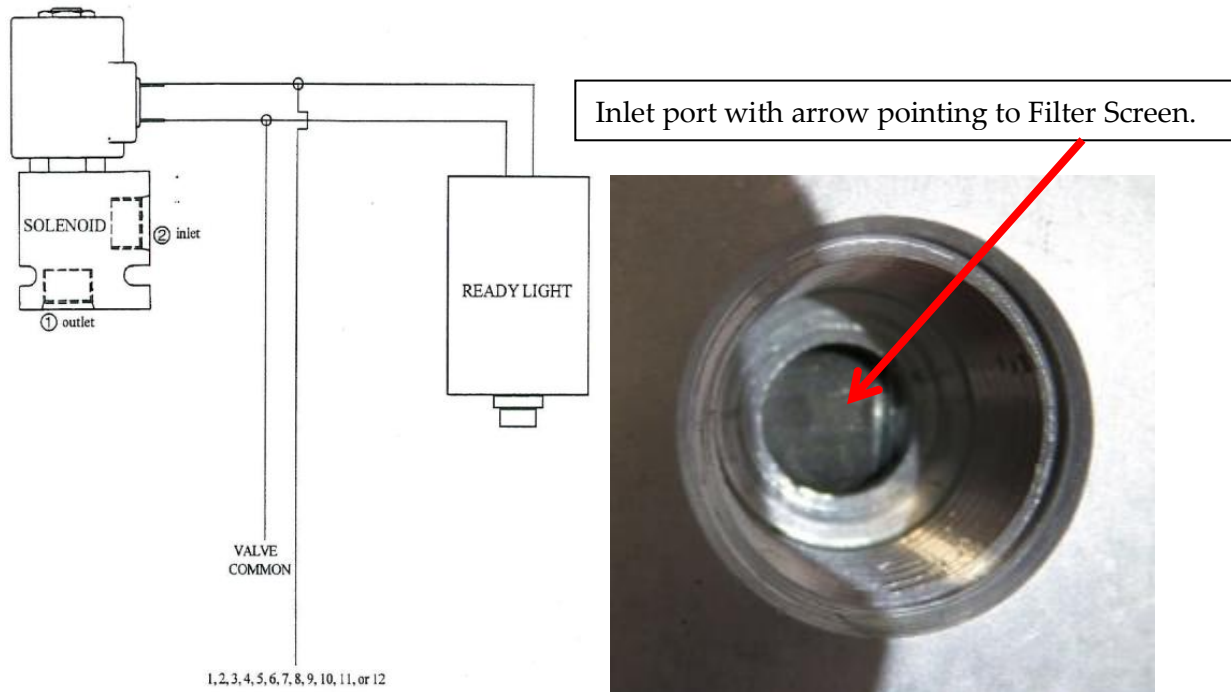


Figure 4 Wiring Guidelines (24VAC)

- ≤150' run length
 - TIM-2000-3A, 22 Gauge, 2-Conductor Wire, 500 Foot Spool
 - TIM-2000-3B, 22 Gauge, 4-Conductor Wire, 500 Foot Spool
 - TIM-2000-3C, 22 Gauge, 8-Conductor Wire, 500 Foot Spool
 - TIM-2000-3D, 22 Gauge, 12-Conductor Wire, 500 Foot Spool
- >150' - ≤250' run length:
 - TIM-18-WIRE, 18 Gauge, 4-Conductor Wire, 500 Foot Spool
- >250' - ≤500' run length. Procure 16 Gauge wire locally.

Note: Use multi-strand conductors. Single-strand copper wire can cause intermittent problems.

2.3 Pressure Relief Kit Installation

Install the Pressure Relief Kit on the outlet side of the pump between the pulse meter and the pump. A properly sized Pressure Relief Kit is a requirement of this system.

Warning: Pressure relief kits prevent damage caused by thermal expansion of the fluids in the system. Thermal expansion can cause pressure build-up in excess of the rated working pressure of the system's components. Return line must be plumbed back to oil supply tank.

*1:1 ratio diaphragm pumps use, TIM-RELIEF-KIT (100 P.S.I.)

*3:1 ratio pumps and 4:1 ratio pumps use TIM-2000-4 (600 P.S.I.)

*5:1 ratio pumps use, TIM-2000-4 (600 P.S.I.)

*9:1 ratio pumps use, TIM-2000-4A (900 P.S.I.)

Figure 5 Pressure Relief Kit Installation



2.4 Pulse Meter Installation

Install the Pulse Meter (TIM-2000-5) on the fluid outlet side of the pump (after the pressure relief kit). Connect the Pulse Meter wires to the “FLOW METER” terminals on the Expander.

2.5 Air Solenoid Valve Safety Kit Installation

The Big ALEC V is designed to work with an optional Air Solenoid Valve Safety Kit (TIM-2000-2 or TIM-2000-2A). If used, place the air solenoid between the Air Pressure Regulator and the air inlet side of the pump. Run the Air Solenoid wires to the Expander, placing one wire in the air terminal (labeled “AIR”) attach the other wire into a Valve Common terminal.

*TIM-2000-2 (1/4”) Air Valve, air inlet is marked "1" and the air outlet is marked "2 ". This is the opposite of the Fluid Solenoid Valve.

*TIM-2000-2A (1/2") air valves the flow direction is indicated by an arrow on the valve body.

3 System Setup Instructions

The initial display features three large red icons.

- Start (icon is only present when a solenoid valve is detected).
- Total
- Setup

3.1 Start Icon

Pressing the start icon accesses the Tech Name (a numeric name \geq four characters in length).

Example:

- Enter Tech Name “1234”
- Touch Ok icon
- Touch Station 1
- Touch Next icon
- Enter Amount and Unit of Measure (UoM), 1.0 Quarts
- Touch Next icon.
- Delivery display
 - Station 1
 - Product: Oil 10W-30
 - Amount Dispensed: 0.00 Quarts (counts up from 0.00)
 - Amount Requested: 1.00

- Touch Start icon
- Dispense fluid
- Touch Reset icon to stop delivery

3.2 **History Icon**

Touching the History icon displays the Big ALEC V dispense History (six rows, six dispense events displayed per page) which includes the following columns.

- Date/Time (mm.dd/yy 11:11 _m) (Can be set for 24 Hour Format.)
- Station
- Tech (e.g., 1234)
- Amount (e.g., 2.2222 quarts; four places to the right of the decimal point)
- Status (Complete, Canceled)

There are three icons at the bottom of the History display.

- Back (return to previous)
- Next (displays prior dispenses)
- Print (Print History or Print Weekly Totals)

3.3 **Setup Icon (Administrative Password required)**

Lower right-hand corner of the display contains the following data,

- Console Rev _
- Expander 1 version _
- Expander2 not present _

Touching the Setup icon displays the Enter Password display.

- Enter Administrative Passcode (25325)
- Touch Ok icon
- Setup display.
 - Set Date/time
 - Year/Month/Day/Hour/Minute (Can be set for 24 Hour Format)
 - Touch Back icon to save
 - Configuration
 - 1 Product, 12 Bays (aka Stations)
 - 2 Prod, 6 Bay
 - 2 Prod, 12 Bay (not implemented)
 - Touch Cancel icon or Set icon as appropriate
 - Product Names
 - Touch icon to choose between 22 preconfigured product names
 - Five spare name icons are available editing via the Edit icon (25 character length max.; only the first five characters are displayed)
 - Touch More icon for additional choices
 - Touch Ok icon to save product name
 - Passwords
 - Administrative Password

- Touch Edit icon to edit Administrative password (**Caution: retain factory preset code 25325 until software updates are implemented**)
 - Touch Ok icon to save password
- Require Logon Before Dispense
 - Touch Edit icon to choose between Yes or No.
 - Touch Set icon to set mode.
- Technician ID's (Number of possible Techs = 10)
 - Touch Edit icon to revise Tech ID
 - Touch New icon to create new ID (8 character max.; only 4 characters display)
 - Touch Delete icon to delete ID.
- Calibrate
 - Current setting: 378 pulses per gallon
 - Calibrate Dispenser display
 - Pulses per UoM
 - Calibration
 - Enter pulses per Unit of Measure (UoM)
 - Enter UoM
 - Touch Ok icon to save calibration factor.
 - Certified Measure
 - Station 1
 - Touch Station 1 icon
 - Touch Next icon
 - Enter numerical amount of fluid to be dispensed, e.g., 1.00
 - Enter UoM, e.g., Gallons
 - Touch Next icon
 - Measured Amount: _ Gallons
 - Calibration _ Pulses
 - Dispense fluid to be dispensed.
 - Touch Save icon or Cancel icon as appropriate
- Printer Setup
 - Set Baud Rate:1200/2400/4800/.../115200 (Typical: Baud Rate is 9600)
 - Touch Ok icon to save or Cancel icon as appropriate
- Reset
 - Reset Totals
 - Are you sure?
 - Touch Ok icon to Reset Totals
 - Clear Logs
 - Are you sure?
 - Touch Ok icon to Clear Logs
 - Factory Reset
 - Are you sure?
 - Touch Ok icon to Factory Reset

4 Calibration

Note: Big ALEC V is factory set to 378 pulses per gallon (matches the TIM-2000-5 Pulse Meter).

For best calibration accuracy, calibrate the longest product run (greatest distance between pump and fluid solenoid valve).

The two possible calibration methods, 1) Pulses per Unit of Measure Calibration and 2) Certified Measure Calibration, are discussed below.

Note: Calibration can be performed using any station for the associated product. The calibration applies to all stations for that product.

4.1 *Pulses per Unit of Measure (UoM) Calibration*

If you know the Pulse Meter's pulses per Unit of Measure,

- 1) Enter the calibration mode via the Setup menu.
- 2) Touch Pulses Per UoM icon
- 3) Enter the number of pulses and the UoM
- 4) Touch Ok icon
- 5) You will now be back at the Administrative Setup screen. If you are done touch the Back icon to return to the home screen.

4.2 *Certified Measure Calibration*

You will need a certified 1-gallon measuring container (4 liters for certifying liters).

- 1) Enter the calibration mode via the Setup menu.
- 2) Touch Certified Measure icon
- 3) Touch the appropriate Station icon
- 4) Touch Next icon
- 5) Enter the volume and UoM of your certified container

Note: Dispense exactly 1.0 gallon (4.0 liters for liter measuring) of product into a certified measuring container. Do not trickle the flow while dispensing.

- 6) Touch Next icon
- 7) Touch Start Measure icon (Opens fluid solenoid for dispensing and lights the Ready Light)
- 8) When container is filled to the certified measure volume, stop dispensing fluid
- 9) Touch Stop Measure icon
- 10) Touch Save icon (Returns of the Setup menu)
- 11) Press Back to return to the Home screen
- 12) Repeat the above if the system is configured for two products.

5 Operating Instructions

There are two possible modes of operation.

5.1 **Technician Password Enabled**

If the Administrator enabled the Technician password before dispensing, Operator must:

- 1) Touch Start icon
- 2) Enter Tech password
- 3) Touch Ok icon
- 4) Touch Station icon
- 5) Touch Next icon
- 6) Enter the dispense Amount and the Unit of Measure
- 7) Touch Next icon
- 8) Touch Start icon (Opens the fluid solenoid and illuminates the Ready Light)
- 9) Tech dispenses fluid (When preset quantity is dispensed, returns to the Home screen)

Note: Touch Stop icon to stop dispensing. Touch Start icon to start dispensing. Touch Reset icon to cancel dispensing and return to the home screen.

5.2 **Technician Password Disabled**

If the Administrator disabled the Technician password, Operator must:

- 1) Touch "START" icon
- 2) Touch Station icon
- 3) Touch Next icon
- 4) Enter the dispense Amount and the Unit of Measure
- 5) Touch Next icon
- 6) Touch Start icon (Opens the appropriate fluid solenoid and illuminates the corresponding Ready Light)
- 7) Tech dispenses fluid (When preset quantity is dispensed the Touchscreen returns to the Home screen)

Note: Touch Stop icon to stop dispensing. Touch Start icon to start dispensing. Touch Reset icon to cancel dispensing and return to the home screen.

6 **Troubleshooting**

The tests below require a new, good Pulse Meter, Fluid Solenoid Valve, Air solenoid Valve and an Ohm Meter. A new, good spool of wire can be used to run a temporary wire run (across the shop floor) to a Pulse Meter, Fluid Solenoid Valve or an Air Solenoid Valve.

6.1 **Divide the System for Efficient Troubleshooting**

When a system problem occurs we recommend that you split the system in half (Big ALEC/Pulse Meter).

1. Wire a new, clean TIM-2000-5 Pulse Meter directly into the Expander (e.g., Station 1)
2. Set the Touchscreen to 1.0 quarts and blow through the Pulse Meter to rotate the gears.
3. If the Touchscreen counts up to 1.0 quart, de-energizes (closes) the station's Fluid Solenoid Valve and returns to the Home screen, you know that the Touchscreen, CAT5 cable, AC Power Supply, and Expander station are good. Repeat as required.

Note: To verify the Fluid Solenoid Valve and Air Solenoid Valve circuitry: 1) Wire a new, air or fluid valve into the Expander (e.g., Station 1). 2) Touch the Start icon. 3) Verify you can blow through the new air or fluid valve (from inlet to outlet).

* TIM-2000-2 Air Valve, air inlet is marked "1" and the air outlet is marked "2".

* TIM-2000-2A air valve, the flow direction is indicated by an arrow on the valve body.

* TIM-2000-37 Fluid Solenoid Valve inlet is marked "2" and the outlet is marked "1".

6.2 *Pulse Meter Wiring*

To validate the Pulse Meter wiring (the wire run between the Expander and the Pulse Meter),

1. Disconnect the installed Pulse Meter
2. Wire a new, clean TIM-2000-5 Pulse Meter in place of the installed Pulse Meter,
3. Set the Touchscreen to dispense 1.0 quarts and blow through the Pulse Meter.
4. If the Touchscreen counts up to 1.0 quart, de-energizes (closes) the Fluid Solenoid Valve and returns to the Home screen you know that the Pulse Meter wiring is good.

Note: Use multi-strand conductors. Single-strand copper wire causes intermittent problems.

6.3 *Pulse Meter*

Hazard: Disconnect the air supply from the oil Pump and bleed off oil pressure in the delivery line prior to opening the Pulse Meter.

To validate the installed Pulse Meter,

1. Remove the Pulse Meter rear cover and look for misaligned gears and dirt in the gears.
2. Verify that both axle shafts are pressed tightly into the pulse meter body (if axle shafts are loose, replace Pulse Meter; do not attempt to repair).
3. Connect an Ohm meter to the pulse meter wires (disconnected from wire run), spin the pulse meter gears by hand and verify that the Ohm meter detects open/short pulses.