BIODIESEL BLENDING TROUBLESHOOTING MANUAL

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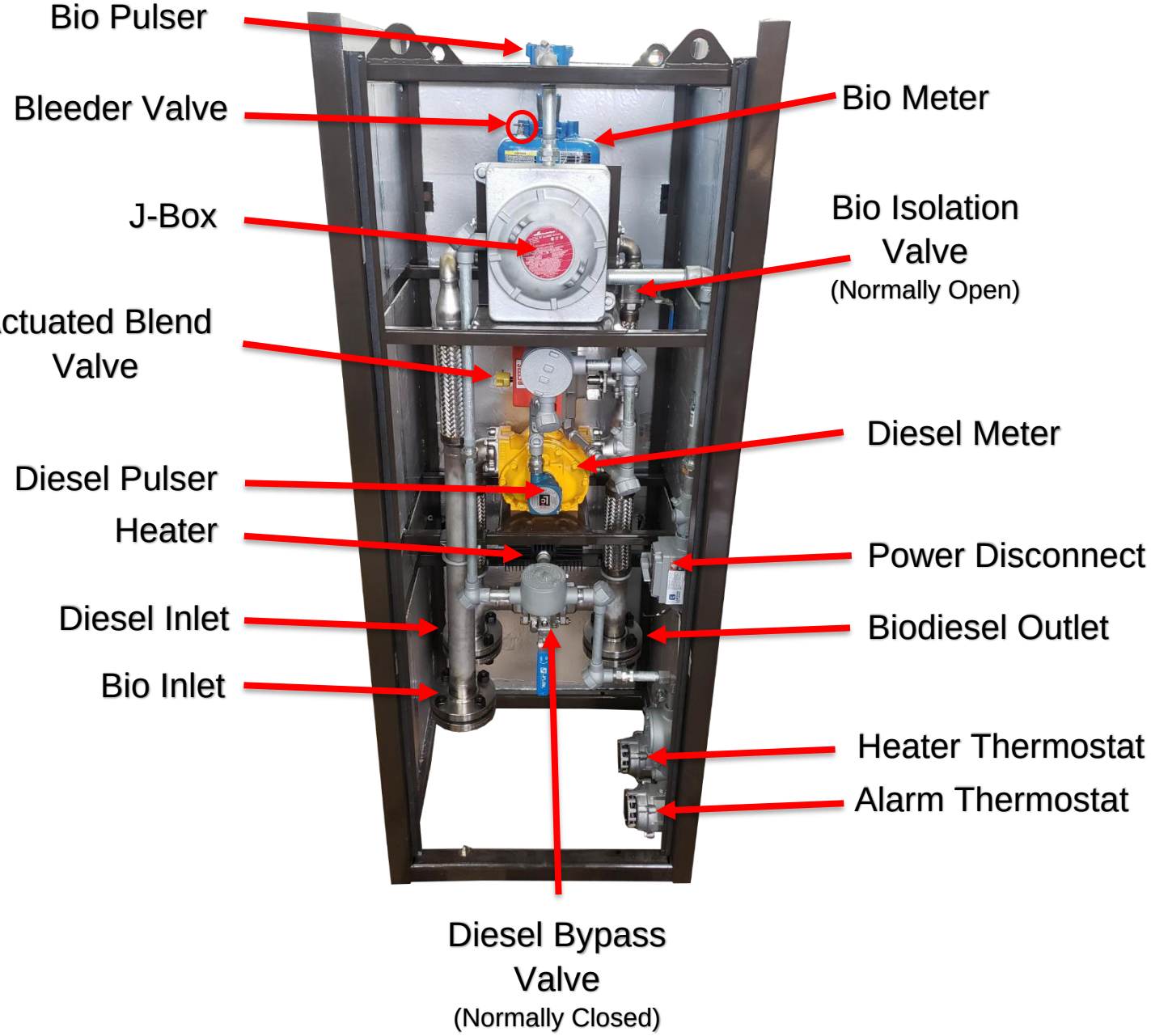
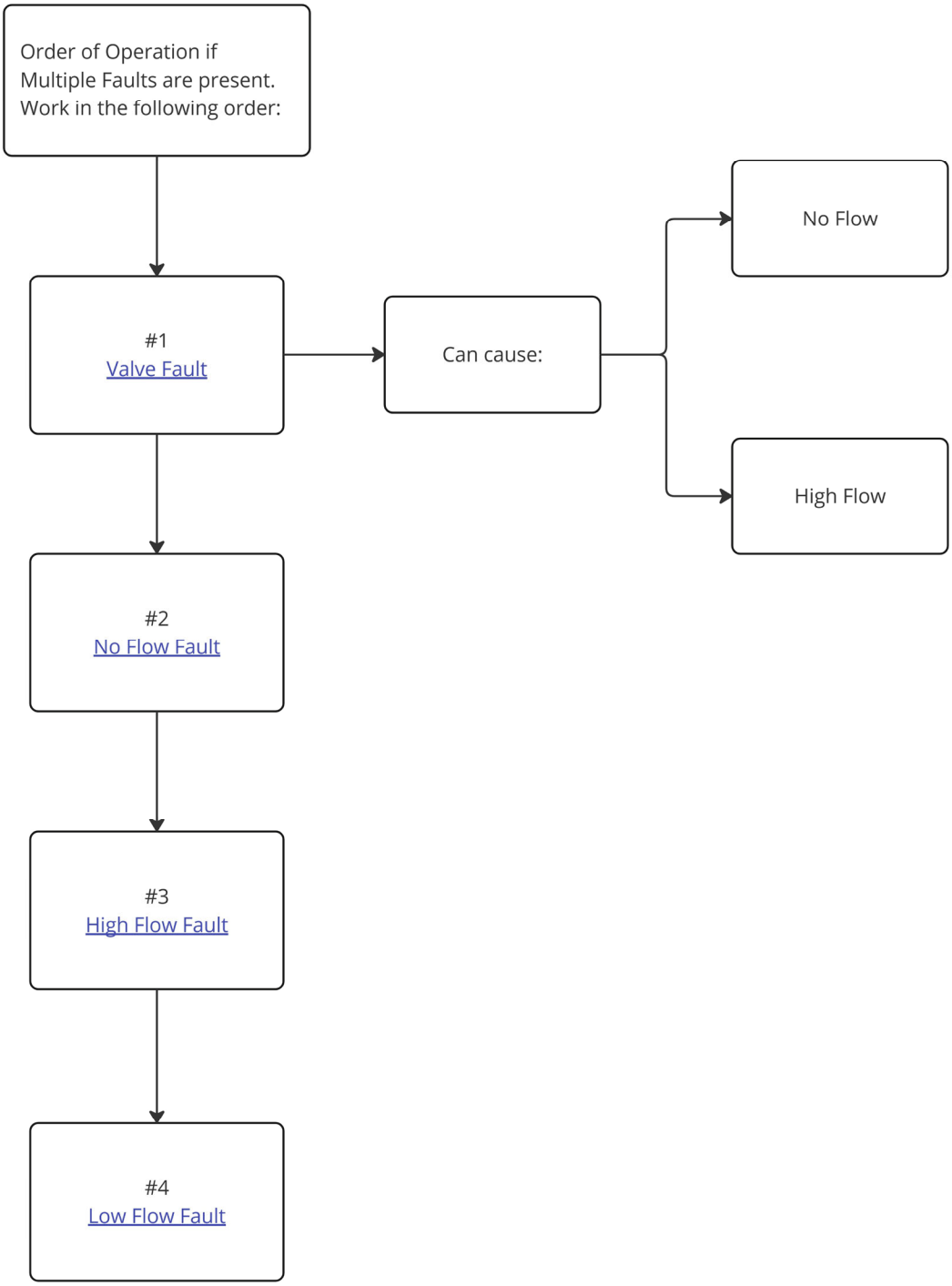
For an overview of Semler's Biodiesel Blending Cabinet, watch here.

Overview of Major Components



Biodiesel Troubleshooting Process



Valve Fault

Condition:

Valve has not responded to commands from PLC as verified through feedback loop

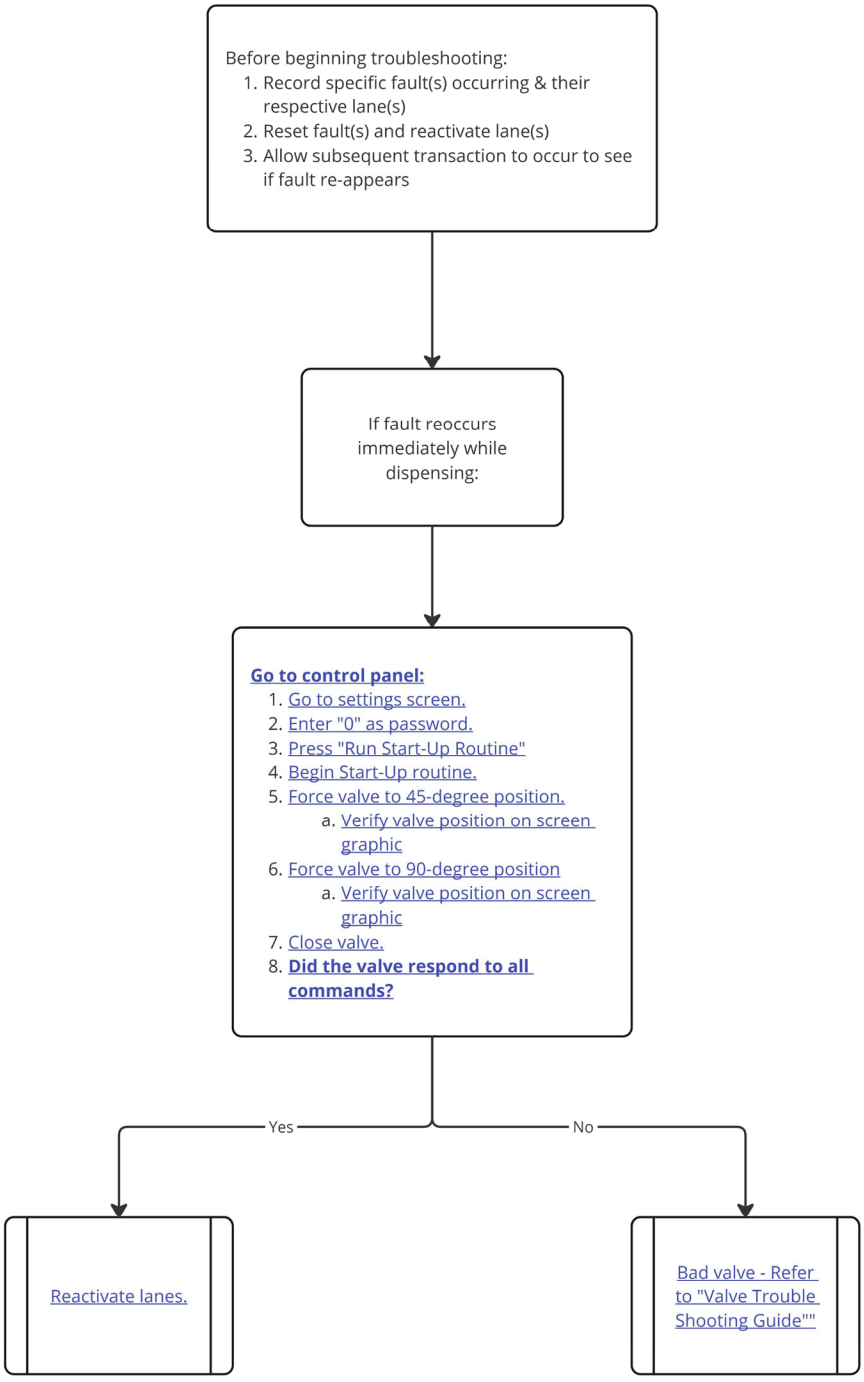
Primary Causes:

1. Valve has become unresponsive
2. B100 Pump is not supplying product so valve cannot achieve desired blend no matter how much it opens
3. Valve has come out of calibration
4. Valve has failed

Outcome:

System sets alarm and tries to completely close valve if possible. System must be address and lane must be reactivated

Valve Fault Troubleshooting



No Flow Fault

Condition:

No bio has been registered through system while lanes are active and diesel flow is being recorded

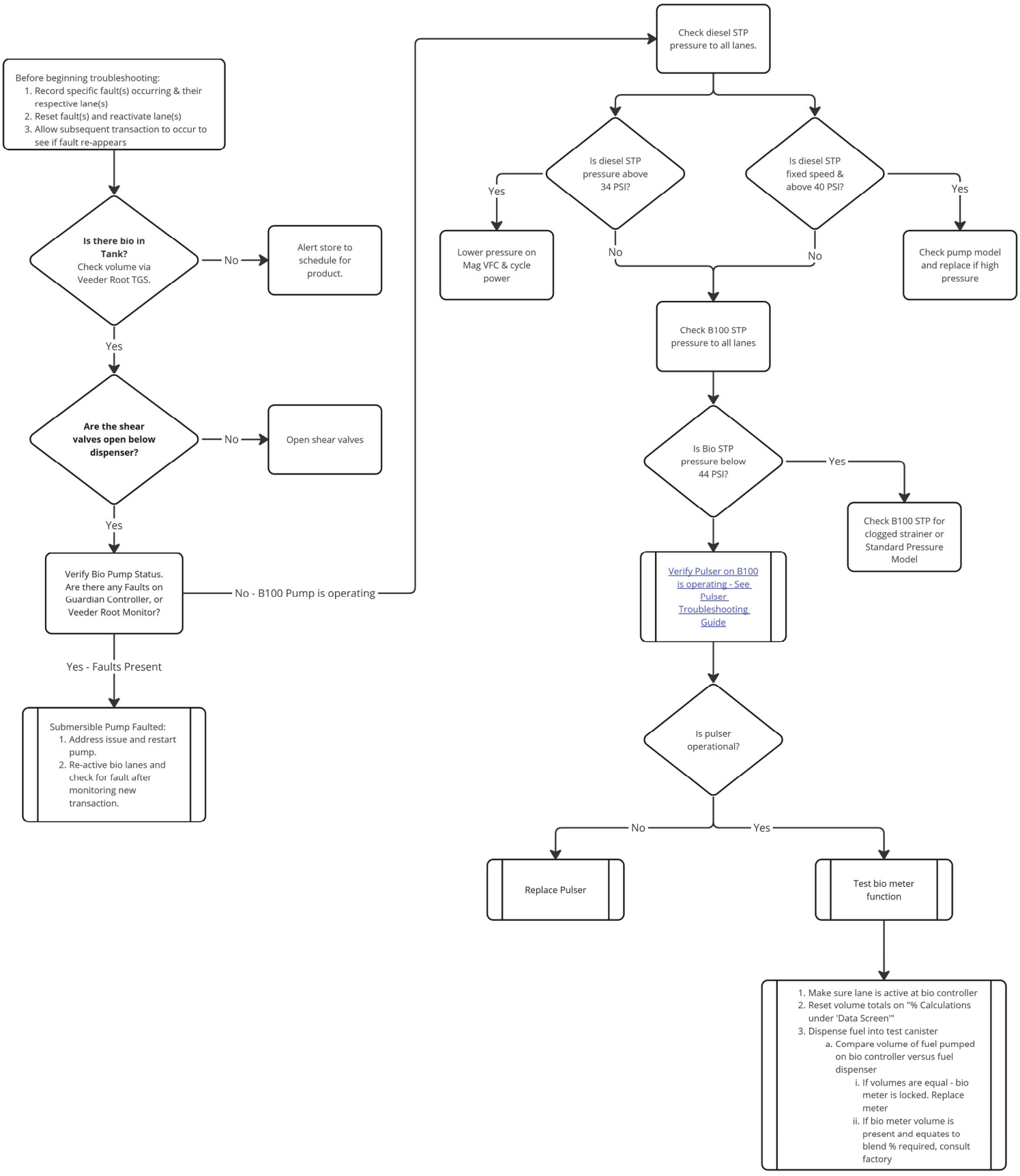
Primary Causes:

1. Diesel pressure is too high and bio cannot inject into diesel line
2. B100 pump is not a high pressure model and bio cannot inject into diesel line
3. B100 pump is faulted
4. Valve is unresponsive and not opening
5. Bio Pulsar has gone bad and is not sending a signal for valve to open up while diesel is flowing
6. Manual valve is closed upstream of blend cabinet

Outcome:

System sets alarm and tries to completely close valve if possible. System must be address and lane must be reactivated

No Flow Fault Troubleshooting



Pulser Troubleshooting Guide

Are there lights on the pulser circuit board?
1. Open the pulser cover.
2. Check for lights on the board.

No

Is there power coming to the pulser terminals?
Using a multimeter, check for 24VDC between the terminals labeled "VIN" and "GND" on the terminal block.

Yes

Replace pulser.

No

Is there 24VDC in the J-box?
Using a multimeter, check for 24VDC between the terminals labeled "24V" and "0V" on the top terminal block.

Yes

Check wire connections to pulser.

No

Are the wires terminated securely?

No

Secure wires properly.

Yes

Check the corresponding wire connections at the control panel.

Yes

Can pulses be generated manually?
1. Remove the terminal block from the pulser circuit board.
2. Remove the board from the enclosure by removing the 3 screws and pulling it out.
3. Re-insert the terminal block and slowly rotate the magnet at the bottom of the board and verify with the technician at the panel that flow is being detected.

No

Are the wires terminated securely on the circuit board?

No

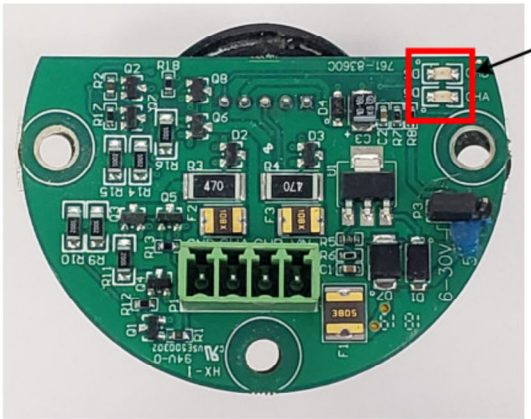
Secure wires properly.

Yes

Replace pulser.

Yes

Pulser is functioning. Return circuit board and continue on the main flowchart.



RETURN TO LOW FLOW TROUBLESHOOTING TREE

High Flow Fault

Condition:

Blender has seem more than 1 GPM above target bio flow rate for 30 consecutive seconds

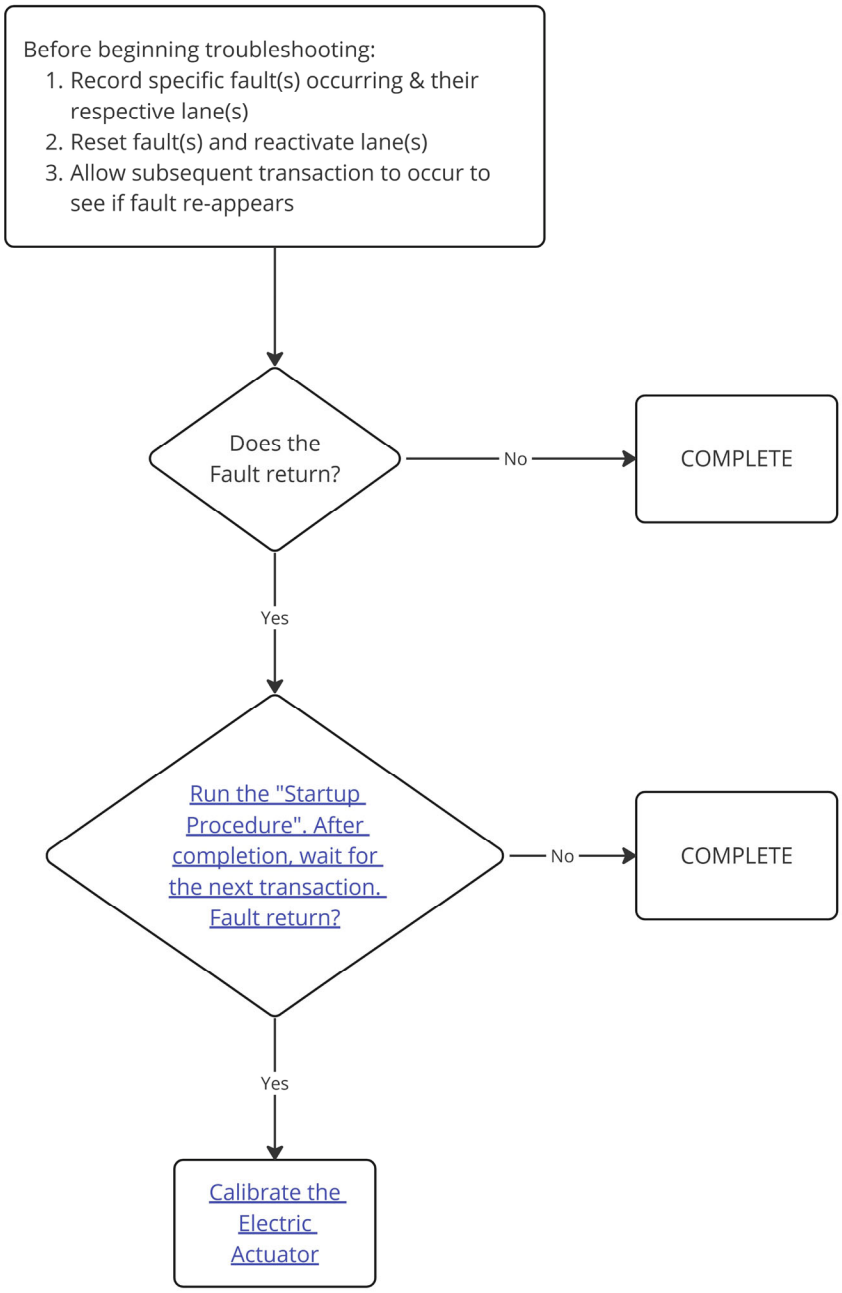
Primary Causes:

1. Valve is stuck in an “open position”
2. Valve has come out of calibration

Outcome:

System sets alarm, shuts down blending, deactivates lane and tries to completely close valve if possible.
System must be address and lane must be reactivated

High Flow Fault Troubleshooting



Low Flow Fault

Condition:

Blender has seen less than 1 GPM below target bio flow rate for 30 consecutive seconds (adjustable to 99.99 secs)

Primary Causes:

1. Diesel pressure is too high and bio cannot inject into diesel line consistently
2. B100 pump is not a high pressure model and bio cannot inject into diesel line consistently
3. B100 pump is faulted
4. Valve is unresponsive and not opening
5. Bio Pulsar has gone bad and is not sending a signal for valve to open up while diesel is flowing

Outcome:

System sets alarm. Blending does NOT shutdown

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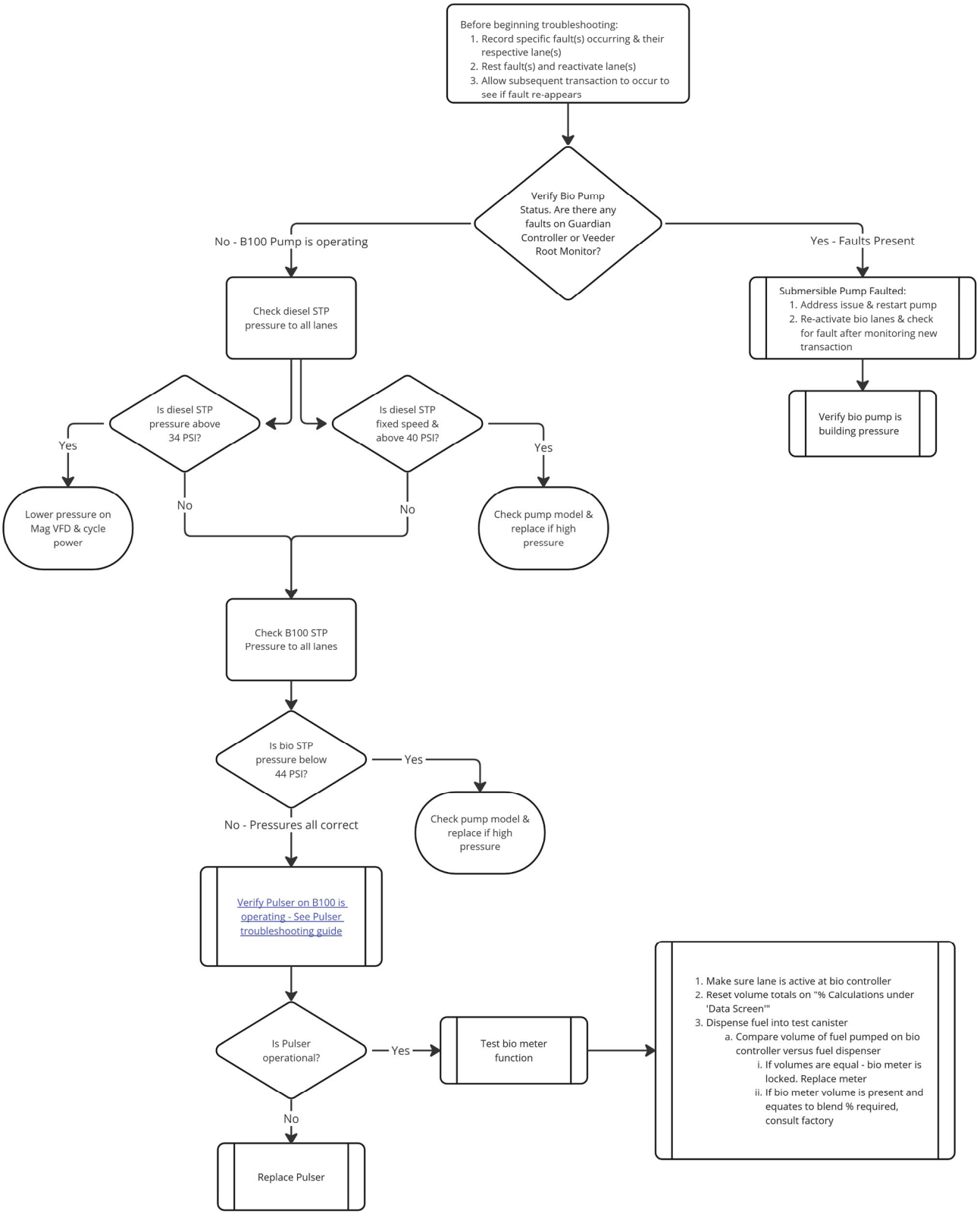
Low Flow Fault Troubleshooting



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Heater Fault

Condition:

Back up temperature probe (TASB) is registering below 40F

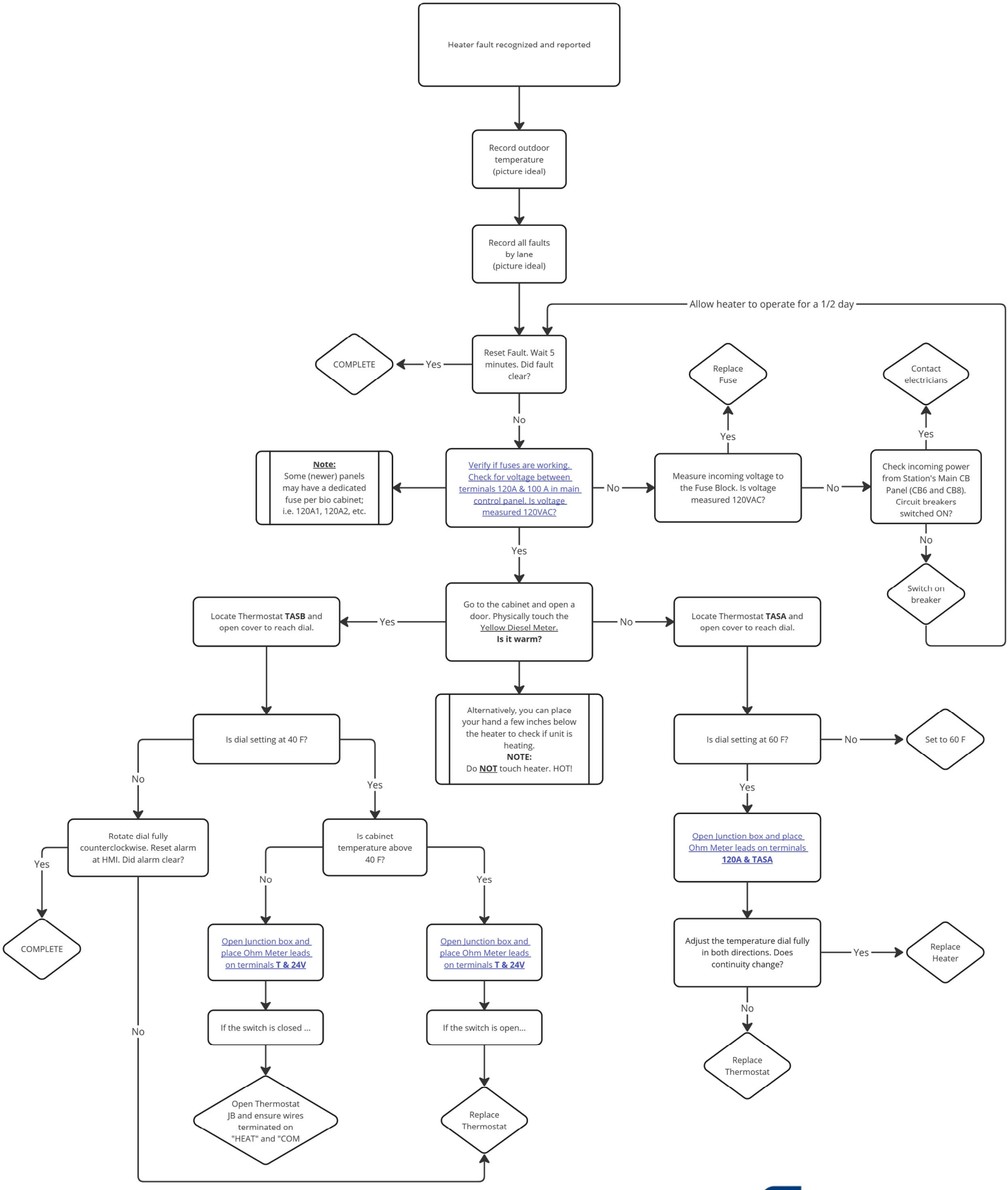
Primary Causes:

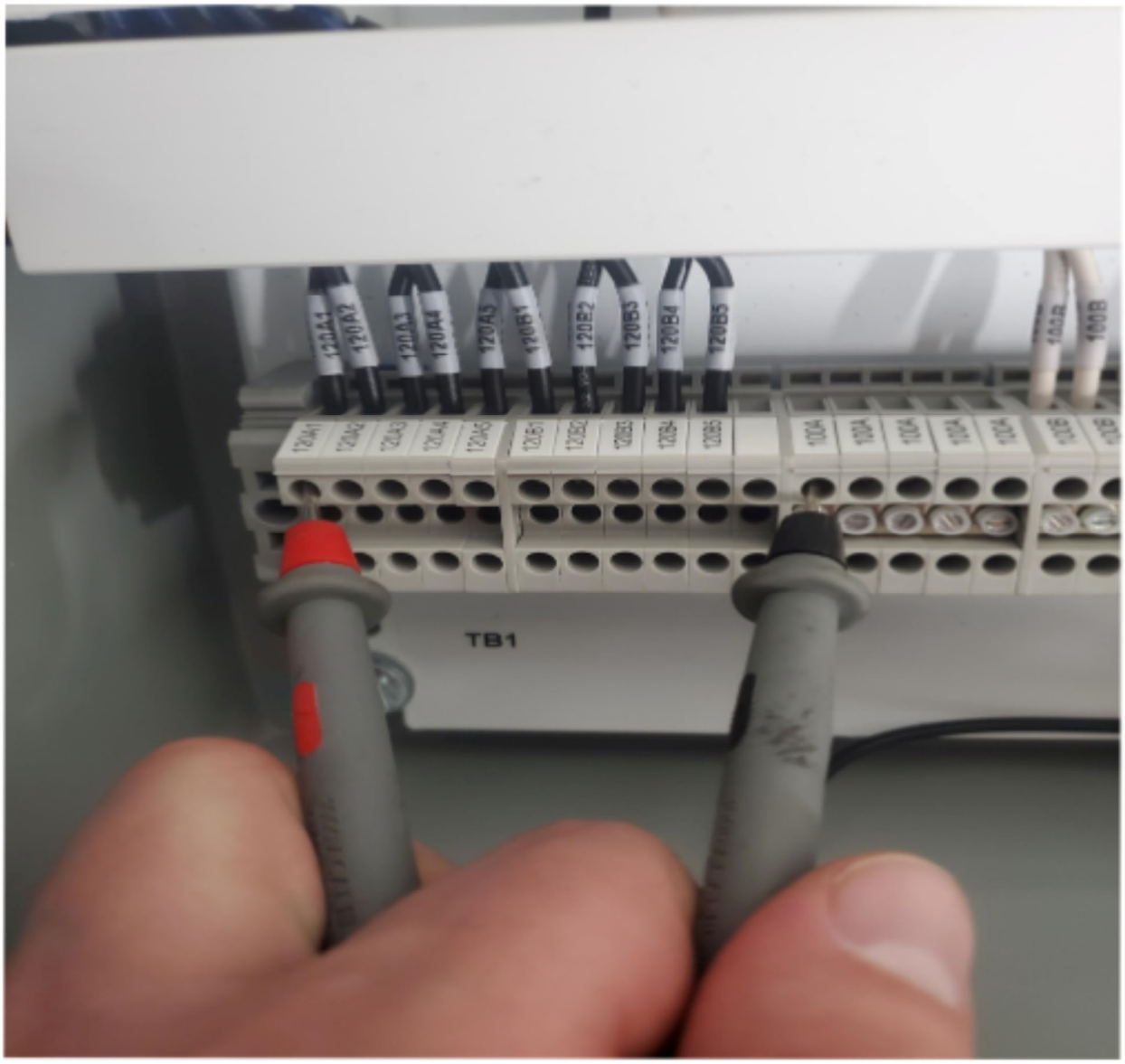
1. Outdoor temperature is below heater differential threshold (0F)
2. Thermostat has been set too high in cold weather
3. Fuse(s) has blown in control panel
4. Door has been removed, is damaged or not been replaced correctly
5. Thermostat has failed
6. Heater has failed

Outcome:

System sets alarm. Blending does NOT shutdown

Heater Fault Troubleshooting





Verify if fuses are working:
Check for voltage between terminals 120A & 100A in main control panel

RETURN TO TROUBLESHOOTING TREE

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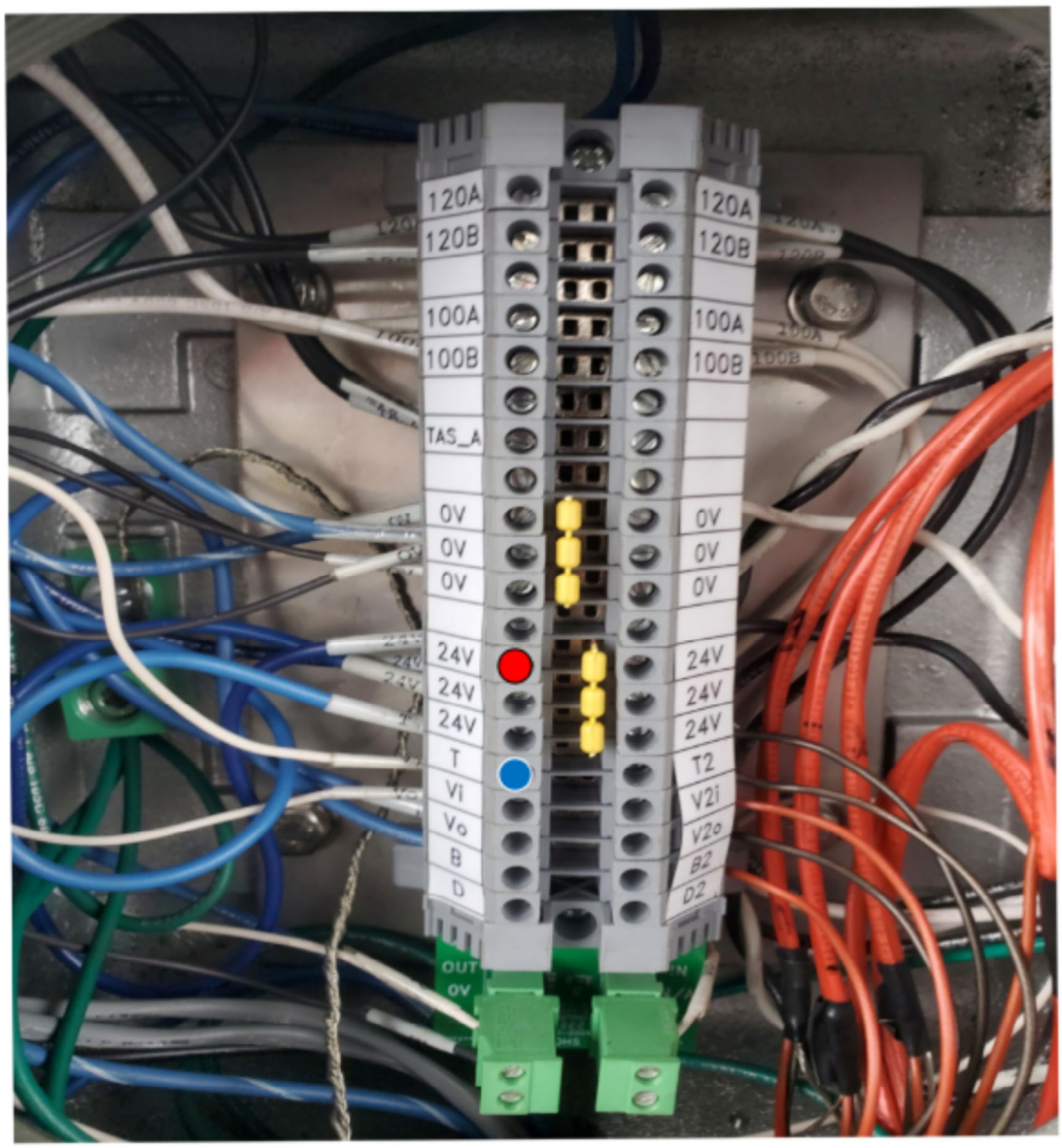

Open Junction box and place Ohm Meter leads on terminals **T** & **24V**

= Red Test Probe

= Black Test Probe

RETURN TO TROUBLESHOOTING TREE

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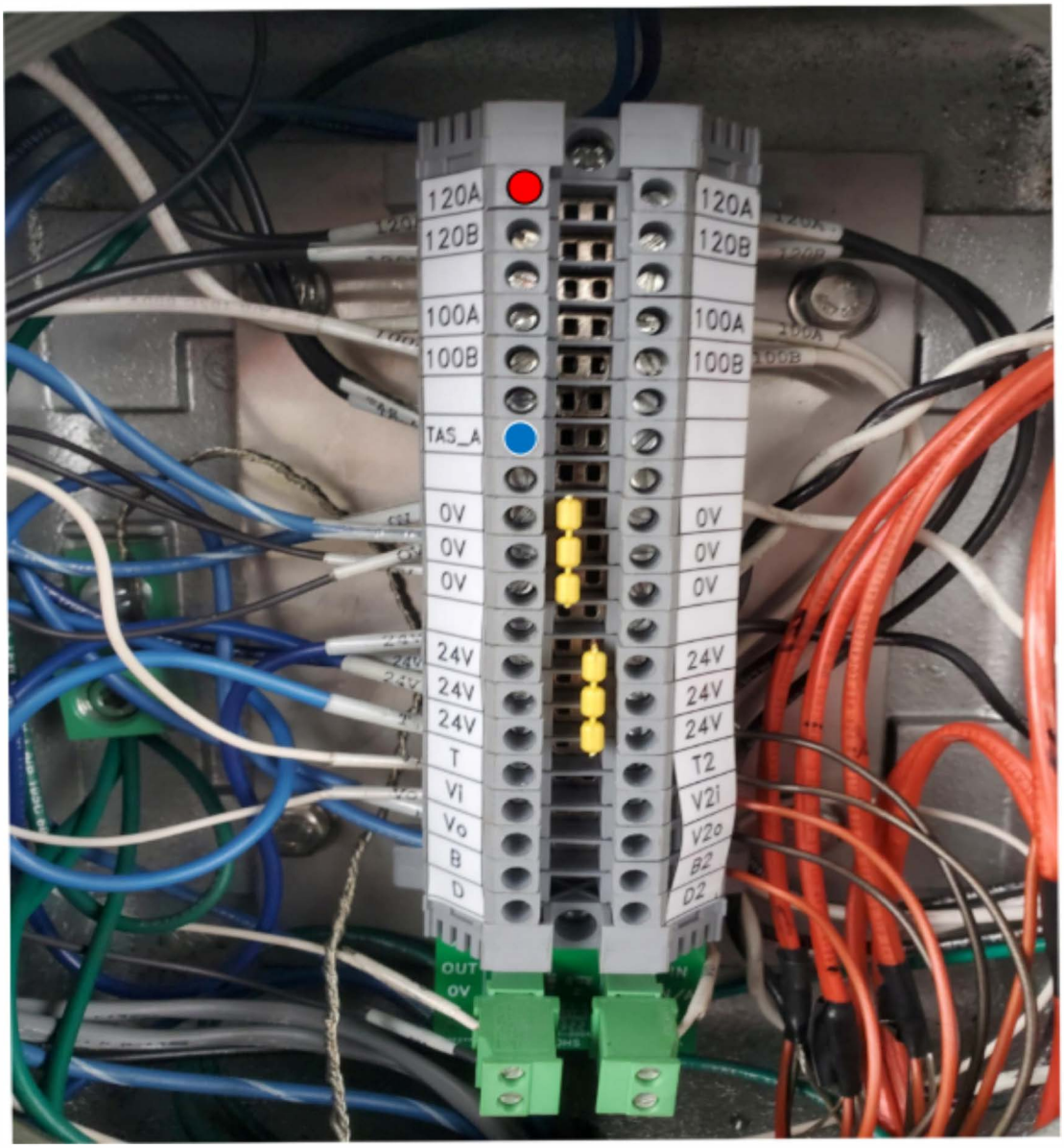

Open Junction box and place Ohm Meter leads on terminals **120A** & **TASA**

= Red Test Probe

= Black Test Probe

RETURN TO TROUBLESHOOTING TREE

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Valve Troubleshooting Guide

How many valves respond to commands from the control screen?
1. Shut the B100 inlet valve.
2. On the screen, navigate to: Advanced Settings - Valve Control
3. Starting with lane 1, activate the lane and force the valve open. Verify with a worker in the sump that the valve is responding.
4. Repeat for each valve.

- None
- Only Some
- All

Is there 120VAC in the J-box?
1. Open the J-box on the skid.
2. Using a multimeter, check for 120VAC between the terminals labeled "120" and "N"

No

Are the wires terminatd securely?

- No → Secure wires properly.
- Yes → Check the corresponding wire connections at the control panel.

Is there power at the unresponsive valve(s)?
1. Open the actuator cover.
2. Using a multimeter, check for 120VAC between the terminals labeled "1" and "4" on the top terminal block. (Page 4)

- No → Check wire connections at the actuator and the J-Box.
- Yes → Are the remaining wires running to the valve terminated securely?

Are the remaining wires running to the valve terminated securely?

- No → Secure wires properly.
- Yes →

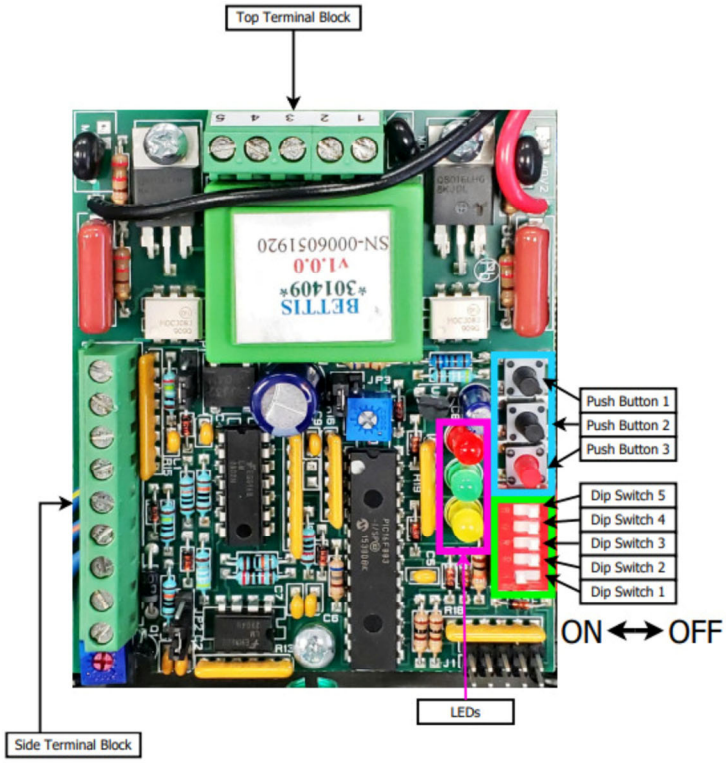
Does the actuator illuminate LEDs or move in calibration mode? (See page 4 for diagram)
1. Move dip switch #1 to the "ON" position and dip switches #2 through #5 to the "OFF" position. (Note: take care to not touch push button 3)
2. Press push button 1 and the red LED should illuminate and then the actuator should rotate CCW until the valve is fully open. If there is no motion, listen for sounds of the actuator trying to move.
3. Press push button 2 and the green LED should illuminate and the actuator should rotate CW until the valve is fully closed. If there is no motion, listen to sounds of the actuator trying to move.
4. Once finished, move dip switch #1 back to off.

- No lights, no motion, continuous motor sounds → Replace actuator.
- Lights illuminate and valve turns → Calibrate valve (See Operation Manual)

Do the valve(s) move in the full range of motion? (0-90 degrees)
Verify by examining the yellow valve indicators in the sump.

- No → Call factory
- Yes → The valves are functional. Return to the original troubleshooting flowchart.

Valve Circuit Board Diagram



BIO-DIESEL BLENDER

SELECT

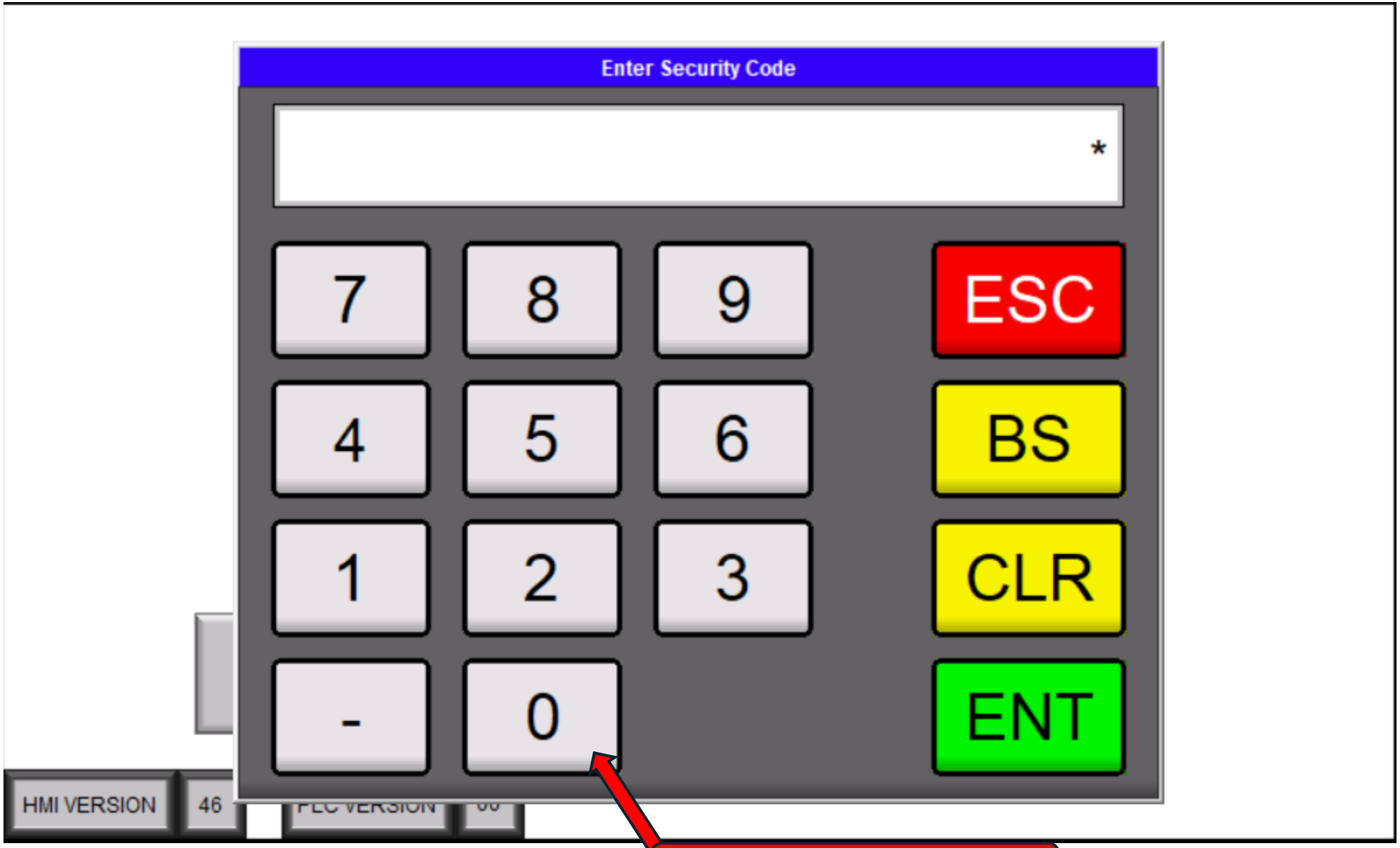
Faults

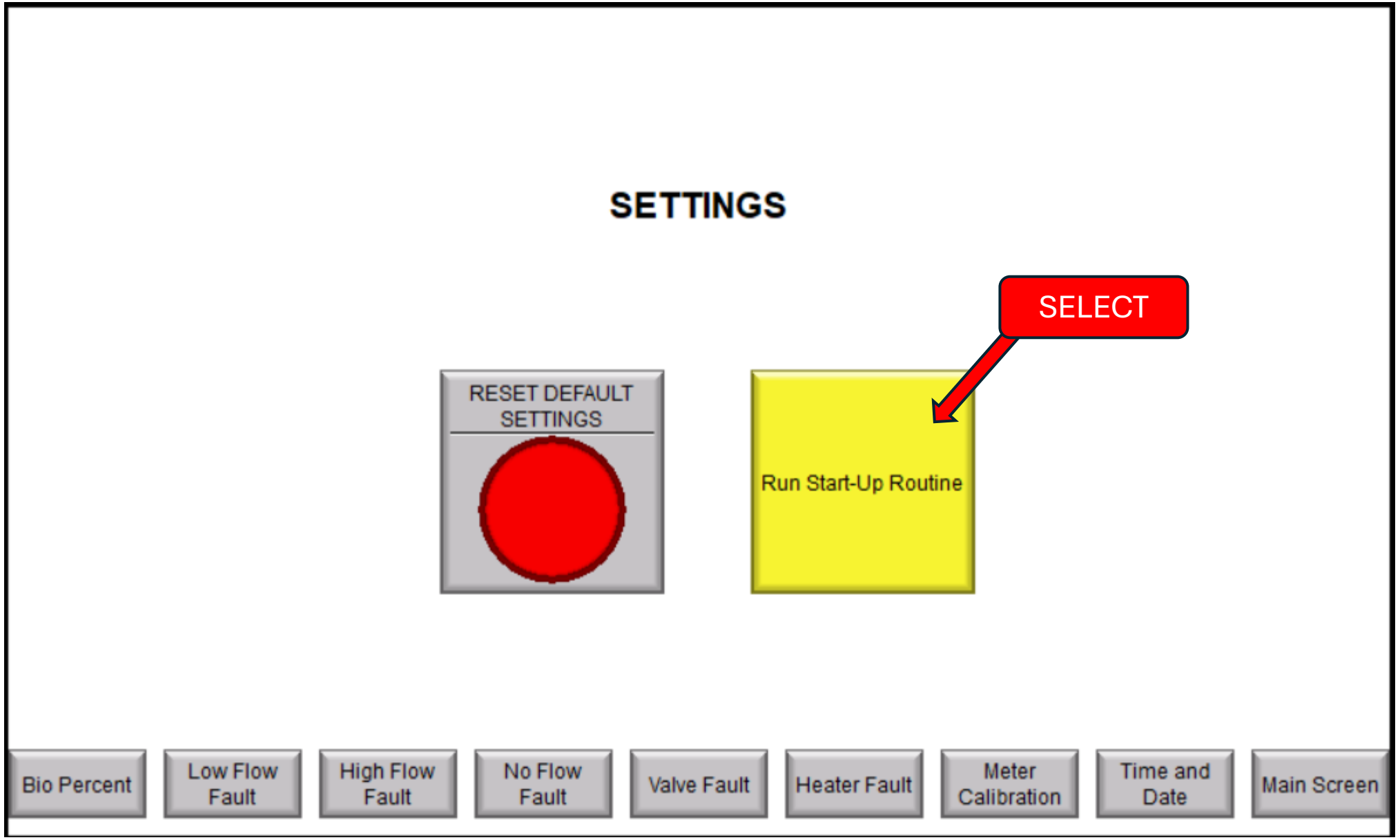
Data

Settings

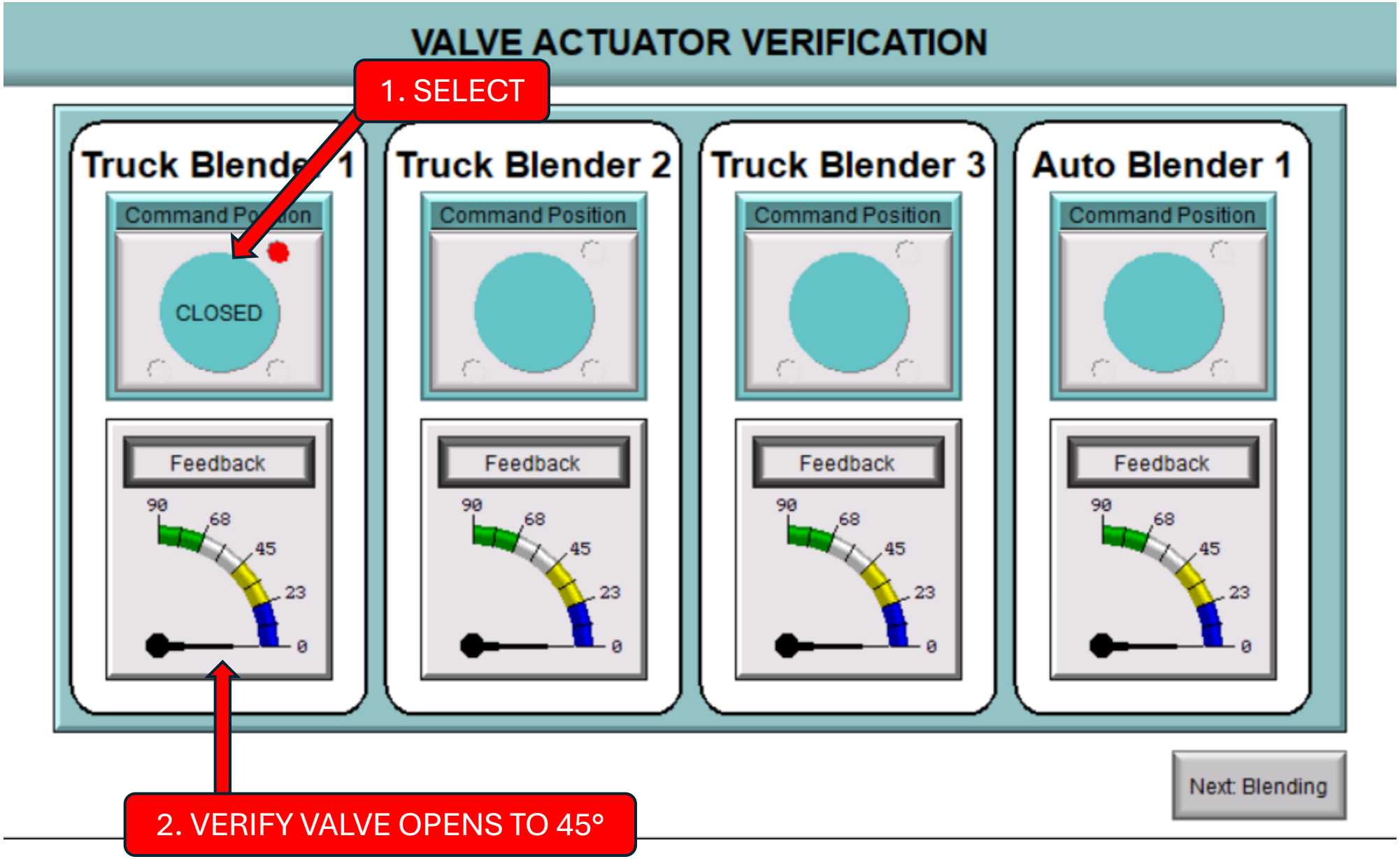
HMI VERSION 46

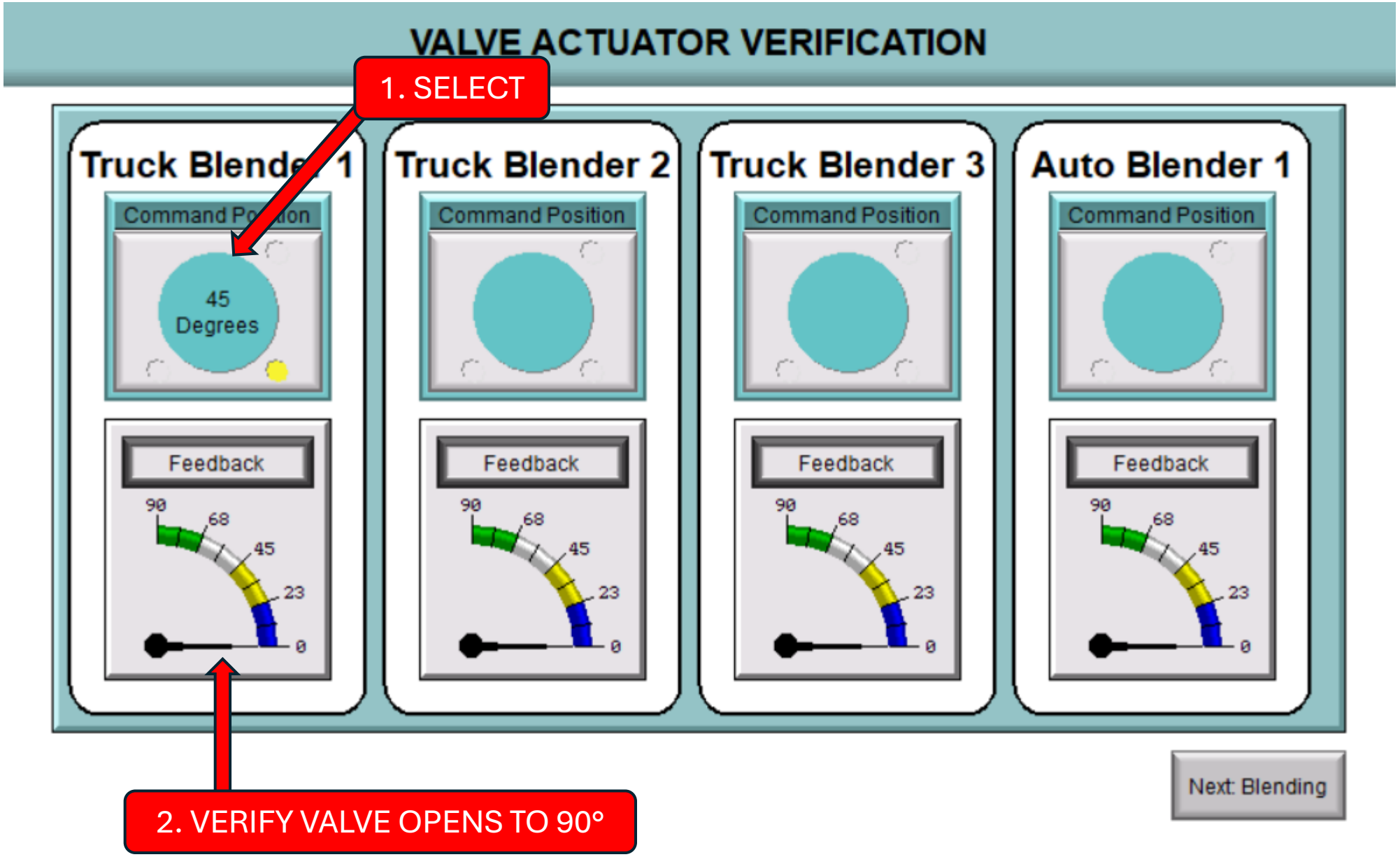
PLC VERSION 00

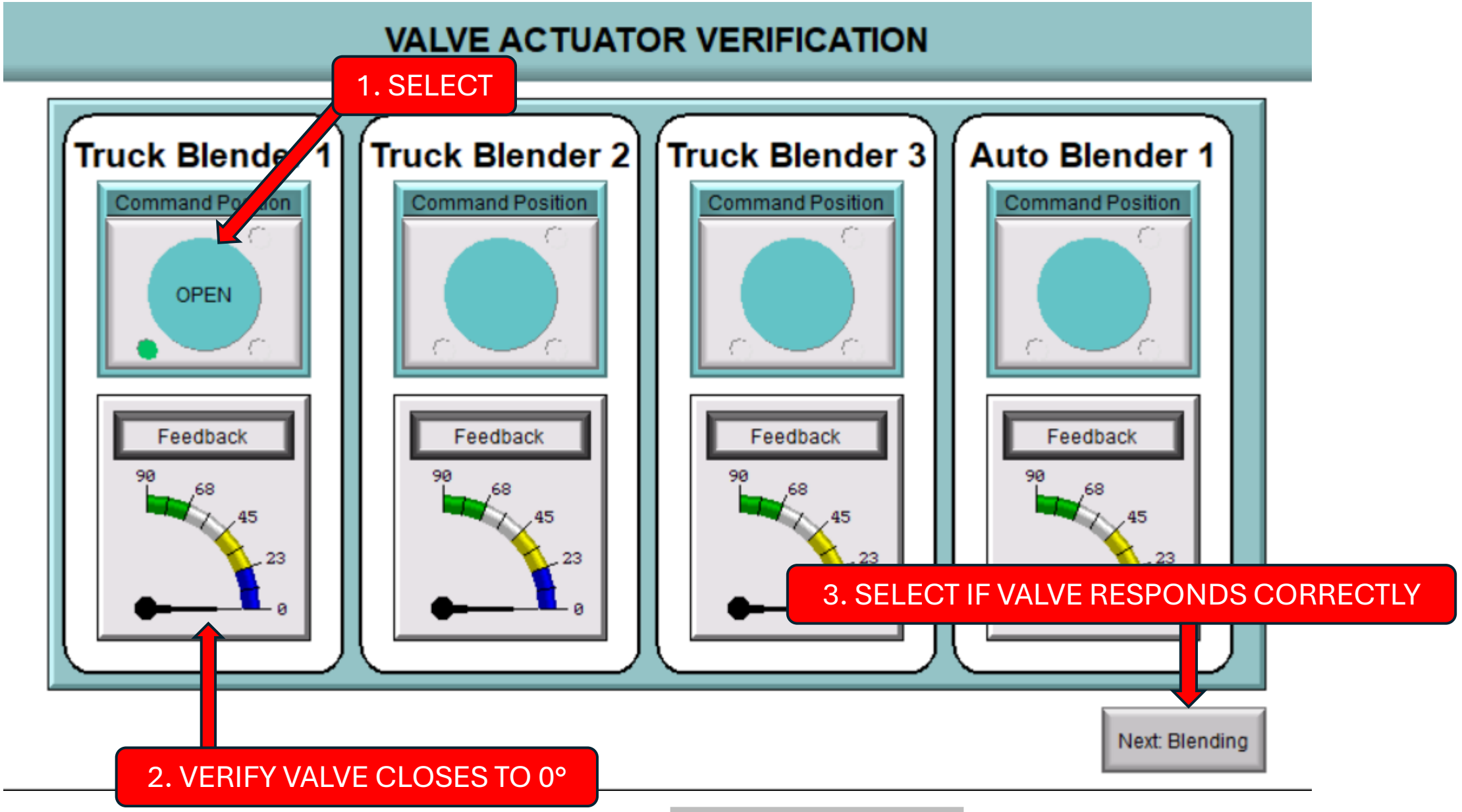

Enter Security Code
*
7
8
9
ESC
4
5
6
BS
1
2
3
CLR
-
0
ENT
HMI VERSION
46
ENTER PASSWORD: 0


SETTINGS
SELECT
RESET DEFAULT SETTINGS
Run Start-Up Routine
Bio Percent
Low Flow Fault
High Flow Fault
No Flow Fault
Valve Fault
Heater Fault
Meter Calibration
Time and Date
Main Screen

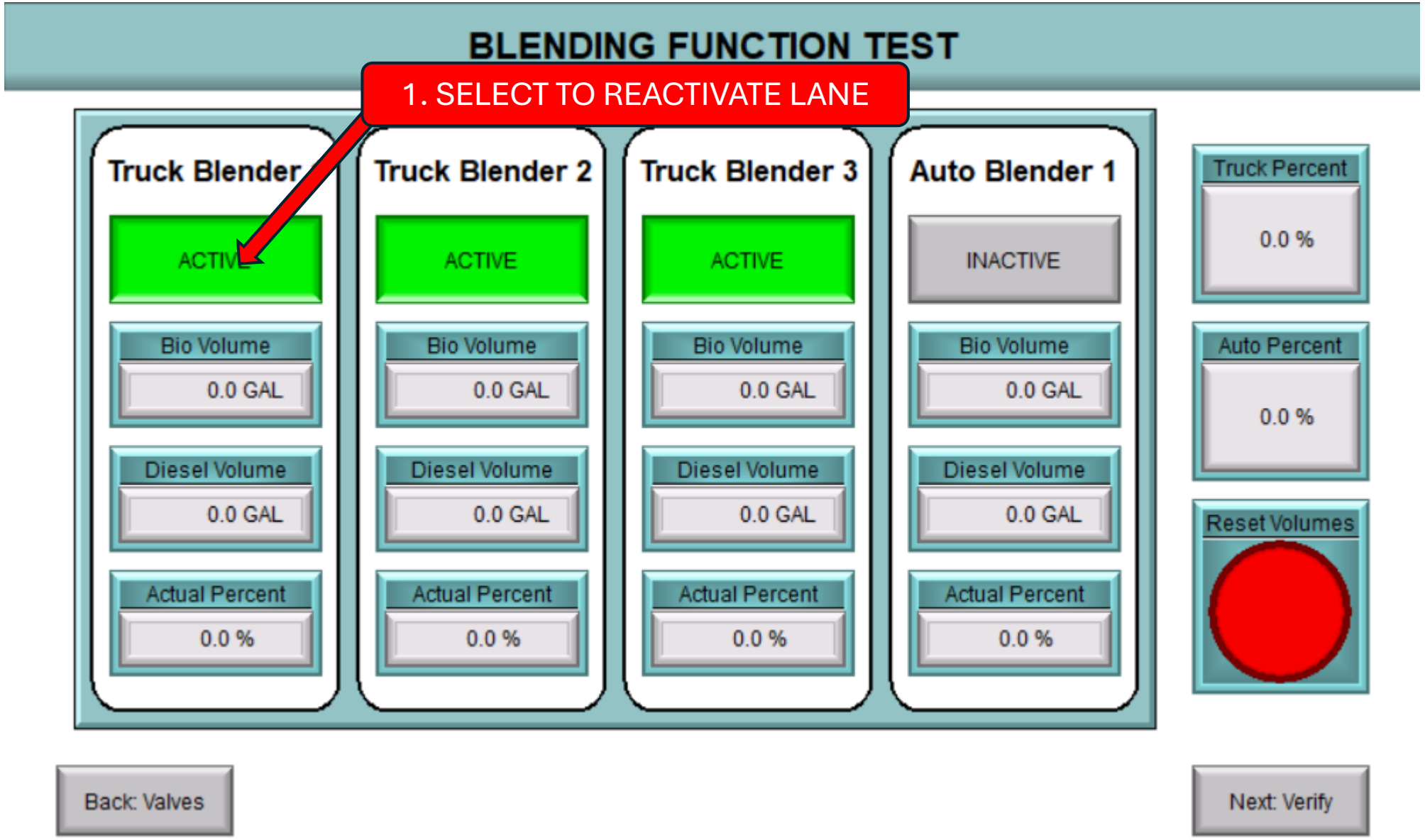
BIO-DIESEL BLENDER


VALVE ACTUATOR VERIFICATION
1. SELECT
Truck Blender 1
Truck Blender 2
Truck Blender 3
Auto Blender 1
Command Position
CLOSED
Feedback
90
68
45
23
0
2. VERIFY VALVE OPENS TO 45°
Next: Blending


VALVE ACTUATOR VERIFICATION
1. SELECT
Truck Blender 1
Truck Blender 2
Truck Blender 3
Auto Blender 1
Command Position
45
Degrees
Feedback
90
68
45
23
0
Next: Blending
2. VERIFY VALVE OPENS TO 90°



RETURN TO TROUBLESHOOTING TREE


BLENDING FUNCTION TEST
1. SELECT TO REACTIVATE LANE
Truck Blender
ACTIVE
Bio Volume
0.0 GAL
Diesel Volume
0.0 GAL
Actual Percent
0.0 %
Truck Blender 2
ACTIVE
Bio Volume
0.0 GAL
Diesel Volume
0.0 GAL
Actual Percent
0.0 %
Truck Blender 3
ACTIVE
Bio Volume
0.0 GAL
Diesel Volume
0.0 GAL
Actual Percent
0.0 %
Auto Blender 1
INACTIVE
Bio Volume
0.0 GAL
Diesel Volume
0.0 GAL
Actual Percent
0.0 %
Truck Percent
0.0 %
Auto Percent
0.0 %
Reset Volumes
Back: Valves
Next: Verify
RETURN TO TROUBLESHOOTING TREE