

Control Modes:

Manual Mode

Compressor: 12V - will run with the planter Raised or Lowered
Hyd - will run only with the planter Lowered
(assuming standard plumbing of hydraulic lines)

Solenoids Will activate only when the planter is Lowered

Automatic Modes

(any one of *Standard, Light, Heavy, or Custom*)

Compressor: 12V - will run with the planter Raised or Lowered
Hyd - will run only with the planter Lowered
(assuming standard plumbing of hydraulic lines)

Solenoids: Will activate only when actually planting. This requires the system to recognize:

- 1) the planter is in the **LOWERED** position (Lift Switch)
- 2) moving forward - **SPEED/GPS** information
- 3) **SEED TUBE DATA**

Normal operating ranges:

Down Pressure Bags: 8psi to 120psi

Lift Pressure Bags: 8psi to 120psi

Notes: The Lift Circuit may spike in pressure at the end of passes as the planter is lifted.
Pressures less than 8 psi in either circuit indicate a LEAK.

Tank Pressure: 0psi to 150psi
Pressures consistently less than 120psi indicate one or more **LEAKS** or poor compressor performance. Check for leaks/Run Health Check.
The tank has a high pressure relief valve that will activate at 165 psi.

Compressor Head Temperature: Ambient to 350°F
Users receive a warning message at 350°F;
the system will disable itself at 400°F.

AirForce Control Module (AFM) Voltage: 11.5 to 14.0 Volts

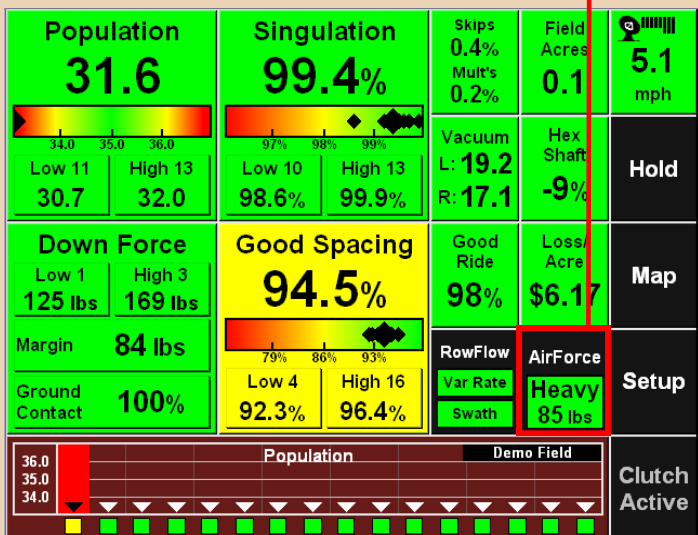
12V Compressor Voltage: 11.5 to 14.0 Volts

Compressor Duty Cycle: 0-80%

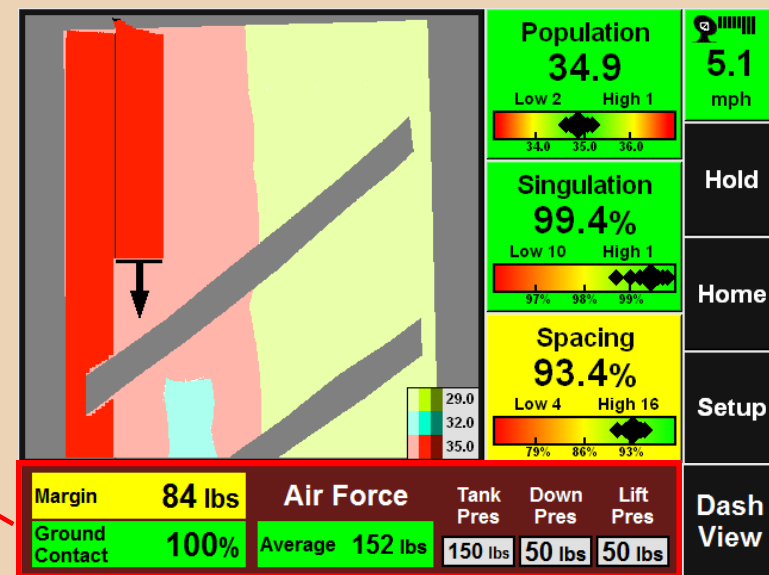
Hydraulic Compressor Requirements: 4gpm at >1800psi

CLOSED CENTER CIRCUITS ONLY!!

When **AirForce** is plugged into the system, the AirForce button will display. By pressing the AirForce button, you will be taken to the AirForce Control center to make adjustments to your system. If this button is not present, navigate: **SETUP - SYSTEMS - DISPLAY - DASHBOARD BUTTONS** and choose the **4X4** option.



An AirForce specific Dashboard Mini-chart is selectable from the Dash View page. This will provide AirForce specific information in greater detail when viewing in the **Full Map** view of the **Home** screen. Pressing the Dashboard Mini-chart will take you to the AirForce Control Center.



Precision Planting[®]



The AirForce Control Center is the heart of the AirForce system. This is where you will Enable/Disable the system, select control modes and monitor the functionality and performance of the system.

Commands the system to ignore Margin and Ground Contact for a period of time. Time periods can be changed under *SETUP*. Usages include entering waterways or ditches within a field.

** See Below

Standard Automatic: This is the most common and default setting for AirForce. The target range for this mode is set for 10-60 lbs of Margin with 100% Ground Contact.

Light Automatic: This control mode moves the target range from 20lbs of Margin to a low of 60% Ground Contact. **This control mode will sacrifice Ground Contact - potential seeding depth - to ensure a minimum Margin!** Use this mode when uniform seeding depth and/or moisture are not as yield limiting as potential row compaction. Rarely used over an entire field, most commonly used for spot controlling small wet areas

Heavy Automatic: This control mode moves the target range to 60-100lbs of Margin with 100% Ground Contact. Use this control mode when extra Down Force is required; dry conditions or cloddy seed-bed. **Note: crushing clods and minimizing Margin are opposing ideas!! Ensuring good seed to soil contact in dry or cloddy field conditions will outweigh any additional Margin concerns.** Commonly used on End Rows.

Custom Automatic: This control mode allows the user to create their own target zone within an automatic control. Once this mode is selected you will notice the addition of four buttons surrounding the target zone graph. To the upper right hand side are Right/Left buttons, used to move the zone back and forth across the graph. To the lower left hand side are Stretch/Squeeze buttons; used to control the size of the target zone.

Manual Mode: This control mode allows the user to designate a pressure or desired force for the system to maintain. This is a static setting that will not fluctuate throughout the field in response to soil-type or tillage changes. The units are selectable under the *SETUP* button to view Pounds or Psi.

****ENABLE CONTROL** - from above: This button toggles on and off AirForce Control. The default state for AirForce is disabled; as shown in top center image. This is for safety reasons; human release prior to automated control.

Compressor Hours: accumulated running time of compressor.

Compressor Duty Cycle: run-time of compressor as a percentage of time. **Long periods of duty cycles ≥ 80% indicates lower performance and/or leaks.** Check for leaks and run the compressor Health Check within AirForce Diagnostics. A detailed progression of the Health Check is provided below.

Compressor Air Temp: compressor head temperature (can be displayed in degrees Fahrenheit or Celsius). **Normal operating range is ambient temperatures up to 350°F.** The system will disable itself at 400°F.

Compressor Voltage: displays volts being drawn by 12V compressor. This box will be 'grayed out'-as shown-when a hydraulic compressor is installed. Normal operating values should be:

- Compressor Idle: 11.5-14 volts
- Compressor Running: 11-13 volts

Tank, Down Circuit, & Lift Circuit Status:

Each box displays **Actual value** in green bar and **Target value** in black arrow. Units are in psi. For systems with only one direction of control installed, the inactive circuit should be 'grayed out.'

Down & Lift Circuits:

Values below 8psi is a clear warning of a leak in the system or a failure to charge. Inability of Actual values to meet Target values indicates insufficient supply (Tank Circuit) or a leak.

Tank Circuit:

Below 120psi the system will become less or none responsive to Margin & Ground Contact as it attempts to conserve air. Consistent values below 120psi indicate: one or more leaks (these may be in the Tank, Down or the Lift Circuits), or poor compressor performance.

Auto Control Hours: accumulated hours that AirForce has operated in any Automatic Control Mode.

Health Check - Step by Step Process

Step 1	Compressor Check	Setting up Compressor Check	Tank Pressure will drop to, or below 100psi
Step 2		Building Tank Pressure to 130psi	System will verify build rate to 130psi
Step 3	Wiring and Plumbing Check - Down	Checking Down Circuit	System will build and release pressure between 20 & 100psi
Step 4	Wiring and Plumbing Check - Lift	Checking Lift Circuit	System will build and release pressure between 20 & 100psi
Step 5	Leak Check Tank	Checking Tank pressure	System will build pressure >120psi, hold, & measure decay
Step 6	Leak Check - Down	Checking Down Circuit Pressure	System will build pressure >100psi, hold, & measure decay
Step 7	Leak Check - Lift	Checking Lift Circuit Pressure	System will build pressure >100psi, hold, & measure decay
Step 8	Verify Gauges	System will prompt user to verify that Display Unit and Analog Gauges are within 5psi of each other	

NOTE: In a healthy system, no individual step or check should take longer than 7 minutes. If this happens, Cancel Health Check and press Reset Modules prior to a second attempt.

AirForce Diagnostics Page

This page displays a visual representation of the AirForce components, utilizing a color scheme to show the individual components status. This will be the primary location for troubleshooting AirForce Systems.

H2O:

Number of hrs. since water separator has been checked and cleared. If not green, check/clear separator then clear prompt under *Hour Counter* at bottom right of screen.

Temperature:

Temperature of compressor head in degrees Fahrenheit or Celsius.

Normal Operation: Ambient to 350°F
Conserve Mode: 350-400°F
 System will disable above 400°F

12V:

Voltage to the compressor through the tractor battery power cable, measured at the 80A contactor.

Compressor Idle: 11.5-14 volts
Compressor Running: 11-13 volts

Not present on Hydraulic Compressors.

Compressor:

Compressor status, using color scheme, also displays performance data on *Run time* and *Fill rate*.

Tank:

Tank circuit health indicator using color scheme, performance data on *Use* and *Leaks*.

Log Files and Hour Counters:

The Log Files give a historical view of the system components and functionality by planting hour. This can be useful by noticing trends to plan maintenance or fix chronic issues. The Hour Counters page provides summary information on run time of system components.

Tank Pressure:

Current tank pressure. Should be **within 5 lbs from that displayed on analog gauge** on front of enclosure.

Lift Switch:

current status, (raised/lowered) of lift switch.

Down Pressure:

Current pressure in Down Circuit. Should be **within 5 lbs from that displayed on analog gauge** on front of enclosure.

AirForce Control Module (AFM): Voltage at the AFM. **Operating values should be 11.5v-14.0v.**

Health Check:

Contains automated programs by which the system can verify the status of individual components and the system as a whole. **This should be run at the completion of initial install, and as a preseason test.** Refer to the Health Check table on the previous page for further details on the Health Check Process.

Event Log:

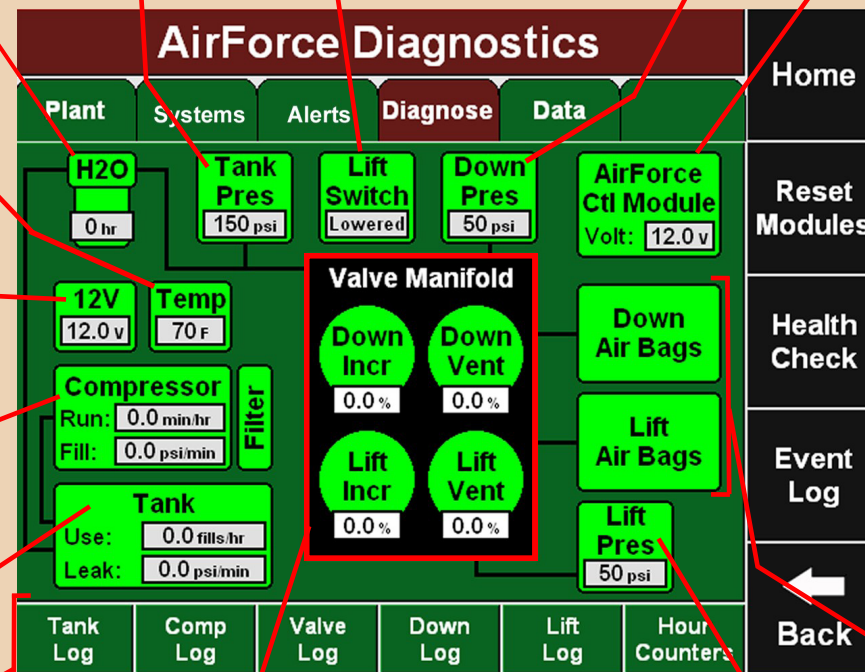
This page logs and displays all AirForce system events and faults/codes. Recommended Actions and specific code faults will be noted for referral to AF Troubleshooting within the Owners Manual. **Excellent location to begin troubleshooting process and/or locate faults within the system.**

Down Air Bags & Lift Air Bags:

Health status of each Circuit. Monitors inputs, outputs, and static values of circuits and tests against expected values.

Lift Pressure:

Current pressure in Lift Circuit. Should be **within 5 lbs from that displayed on analog gauge** on front of compressor enclosure.



Valve Manifold:

Shows solenoid health using color scheme, also shows duty cycle of each solenoid. Typical values should range between 0.1% - 5.0%

Leak Indicator:

If **EITHER** Increase solenoid (DOWN INCR or LIFT INCR) shows a high value; $\geq 4.0\%$ and greater, with a corresponding Vent Solenoid (DOWN VENT or LIFT VENT) value of 0%.