GARDNER DENVER

Experience Proven Results™

13-17-604
Version: 01
February 11, 2009

AIRSMART™ CONTROLLER COMM MODULE

USER'S MANUAL

WARNING – PROHIBITION – MANDATORY LABEL INFORMATION

Gardner Denver positive displacement blowers are the result of advanced engineering and skilled manufacturing. To be assured of receiving maximum service from this machine, the owner must exercise care in its operation and maintenance. This book is written to give the operator and maintenance department essential information for day-to-day operation, maintenance and adjustment. Careful adherence to these instructions will result in economical operation and minimum downtime.

Boxed text formats are used, within this manual, to alert users of the following conditions:

Safety Labels are used, within this manual and affixed to the appropriate areas of the blower package, to alert users of the following conditions:

⚠ DANGER

Indicates a hazard with a high level of risk, which if not avoided, <u>WILL</u> result in death or serious injury.

Equipment Starts Automatically

Health Hazard – Explosive Release of Pressure

Cutting of Finger or Hand Hazard – Rotating Impeller Blade

High Voltage – Hazard of Shock, Burn or Death Present Until Electrical Power is Removed

Cutting of Finger or Hand Hazard – Rotating Fan Blade

Entanglement of Fingers or Hand – Rotating Shaft

⚠WARNING

Indicates a hazard with a medium level of risk, which if not avoided, COULD result in death or serious injury.

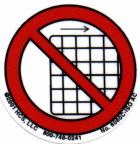
Asphyxiation Hazard – Poisonous Fumes or Toxic Gas in Compressed Air

⚠CAUTION

Indicates a hazard with a low level of risk, which if not avoided, MAY result in a minor or moderate injury.

Burn Hazard – Hot Surface

PROHIBITION - MANDATORY ACTION REQUIREMENTS



Do Not Operate Blower with Guard Removed

Lockout Electrical Equipment in De-Energized State

Do Not Lift Equipment with Hook – No Lift Point

Loud Noise Hazard – Wear Hearing Protection

Handle Package at Forklift Points Only

Read the Operator's Manual Before Proceeding with Task

SAFETY PRECAUTIONS

Safety is everybody's business and is based on your use of good common sense. All situations or circumstances cannot always be predicted and covered by established rules. Therefore, use your past experience, watch out for safety hazards and be cautious. Some general safety precautions are given below:

Failure to observe these notices could result in injury to or death of personnel.

- **Keep fingers and clothing away from rotating fan, belt drive, etc.**
- **Disconnect the blower unit from its power source, lockout and tag out before working on the unit – this machine is automatically controlled and may start at any time.**
- **Do not loosen or remove the oil filler plug, drain plugs, covers, the thermostatic mixing valve or break any connections, etc., in the blower air or oil system until the unit is shut down and the air pressure has been relieved.**
- **Electrical shock can and may be fatal.**
- **Perform all wiring in accordance with the National Electrical Code (NFPA-70) and any applicable local electrical codes. Wiring and electrical service must be performed only by qualified electricians.**
- **Open main disconnect switch, lockout and tag out before working on the control, wait 10 minutes and check for voltage.**

Failure to observe these notices could result in damage to equipment.

- **Stop the unit if any repairs or adjustments on or around the blower are required.**
- **Do not use the air discharge from this unit for breathing – not suitable for human consumption.**
- **An Excess Flow Valve should be on all compressed air supply hoses exceeding 1/2 inch inside diameter (OSHA Regulation, Section 1926.302).**
- **Do not exceed the rated maximum pressure values shown on the nameplate.**
- **Do not operate unit if safety devices are not operating properly. Check periodically. Never bypass safety devices.**

Table of Contents

1 General Information

The AirSmart™ Controller was designed for use in the Gardner Denver Global Line of variable speed, rotary screw air compressors and positive displacement blowers. The AirSmart™ Controller is also capable of controlling fixed speed air compressors and blower which use traditional motor starters. The microprocessor-based unit can control up to three Variable Frequency motor Drives (VFDs) while monitoring all necessary temperature and pressure points in order to safely operate the machine and satisfy user air demand. The Control Panel displays a comprehensive overview of the machine status and allows easy access to operational parameters such as pressure set points, alarm set points and language selection.

The AirSmart Communications Module is an extension of the AirSmart Controller, which provides a means of sequencing multiple compressors or blowers together so that they may act as one machine. The AirSmart Communications Module also provides the ability to monitor machine operation from a remote location through serial and Ethernet connections. Finally, the AirSmart Communications Module can start and stop a machine up to seven different times using a programmable week clock.

1.1 AirSmart Communications Module Features

- ✓ Easy Installation.
- ✓ Battery-backed real time clock.
- ✓ Week clock timer with seven programmable start/stop times.
- ✓ Sequencing control for up to eight compressors or blowers.
- ✓ Two additional pressure transducer inputs for system pressure.
- ✓ Remote monitoring through RS-232 serial port on 9-pin D-Sub connector.
- ✓ Remote monitoring through IEEE 802.3 100 megabit Ethernet port on RJ-45 connector.

2 Communications Module Installation

The AirSmart Communication Module is simple to install. Follow the steps below to attach the Communications Module to the AirSmart Controller.

Step 1 – Remove all power from the compressor or blower!

Step 2 – Remove the rubber plug on the enclosure of the AirSmart Controller to expose the expansion connector as seen in Figure 1 and Figure 2.

Figure 1 - Remove Rubber Cover – Value Controller

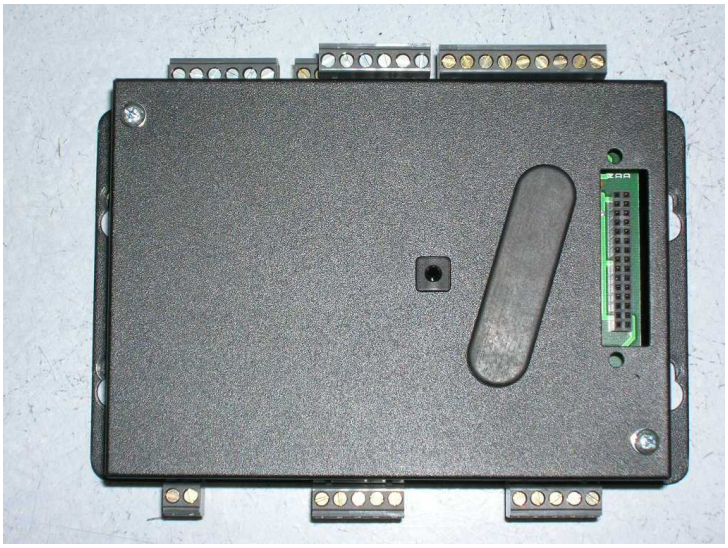


Figure 2 – Remove Rubber Cover – Full Controller

Note – The AirSmart Controllers shown in the photos are not installed in a machine. It is **NOT** necessary to remove the AirSmart Controller from the machine to install the Communications Module.

Step 3 – Inset the connector protruding from the backside of the Communications Module into the expansion connector on the AirSmart controller, as seen in Figure 3, and press into place. **Do not** force the connectors together; the two pieces should fit together easily.

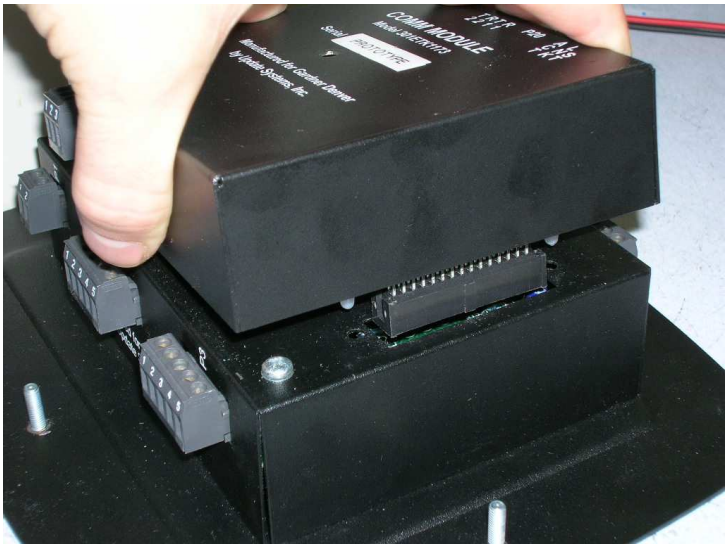


Figure 3 - Insert Comm Module Connector

Step 4 – Secure the Communications Module in place by tightening the captive screw with a #2 Phillips screwdriver as seen in Figure 4 below.

Figure 4 - Tighten Captive Screw

Step 5 – Be sure to read all sections below for proper configuration of the AirSmart Communications Module.

3 AirSmart Controller Menus

3.1 Operational Menus

The Operational Menus are available at all times - while the compressor or blower is running, stopped or even while in a fault condition. To enter the Operational Menu trees press the Right  or Left  buttons to access up to eight different menus. Once the desired menu heading is shown in the fourth line of the display, use the Up  and Down  buttons to access the individual items in the selected menu, which are also shown in the fourth line of the display. If the Up or Down buttons are not pressed within five seconds of pressing the Right or Left buttons, the fourth line of the display will return to its previous state.

It is not necessary to navigate back to the top of a particular menu in order to enter another menu. Simply press the Right  or Left  buttons to go back to the heading of the current menu and then use the Right or Left buttons again to find the desired menu heading as described above.

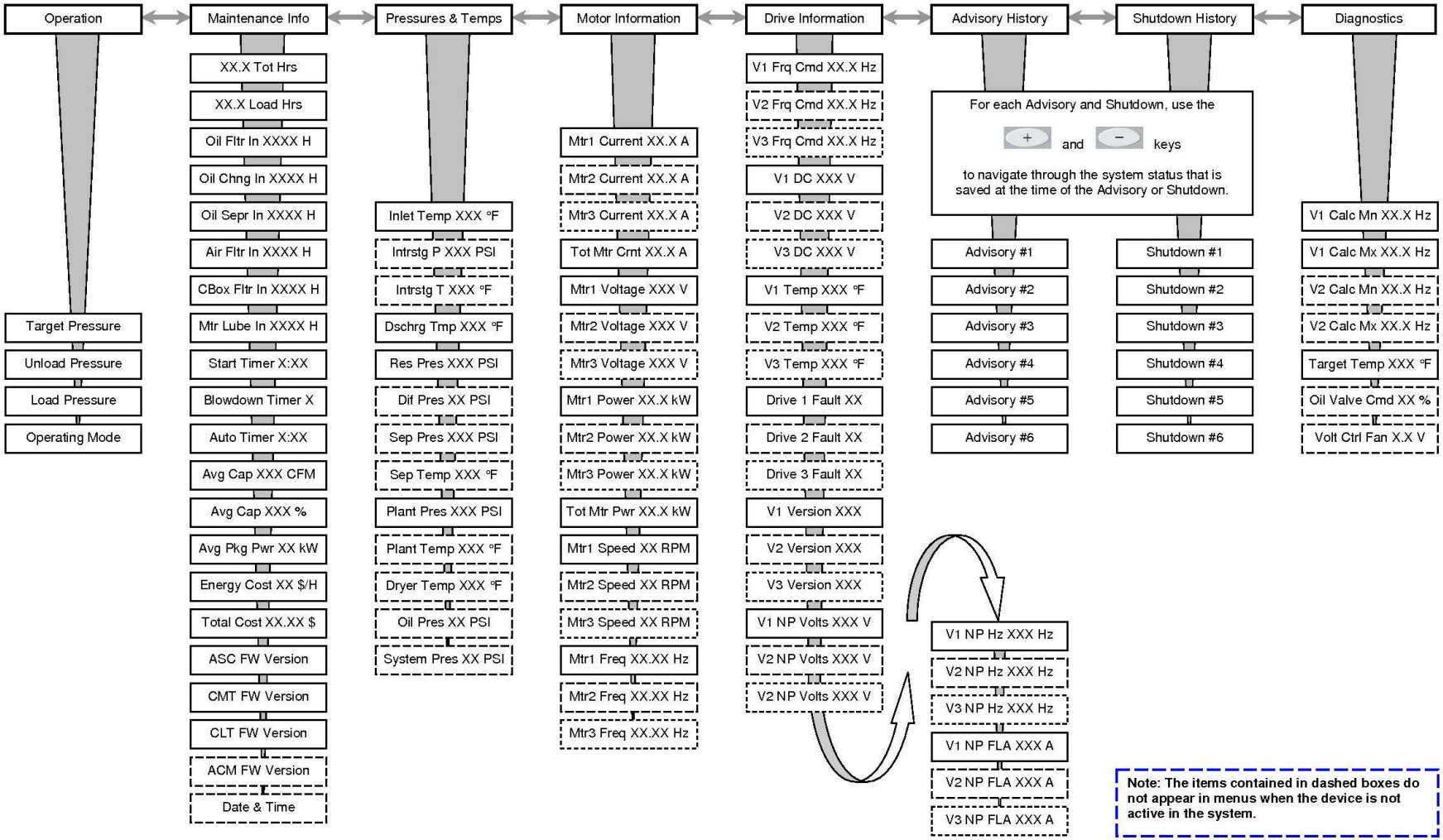
- *Note: Advisory fault information is also shown in the fourth line of the display. If an advisory is active and the fault condition has not been cleared, the Operational Menu text will be periodically replaced by the advisory text*.

- *Note: Only the information associated with the Communications Module is shown below. For a full listing of other menu items, refer to the AirSmart Controller User's Manual, Gardner Denver document 13-17-600 for the compressor application or IQ-7-200 for the blower application.*

AirSmart Controller Operational Menus (Compressor Application)

Use the ◄ ► keys to navigate through the horizontal main menus. These keys are also used to exit the vertical menu items.

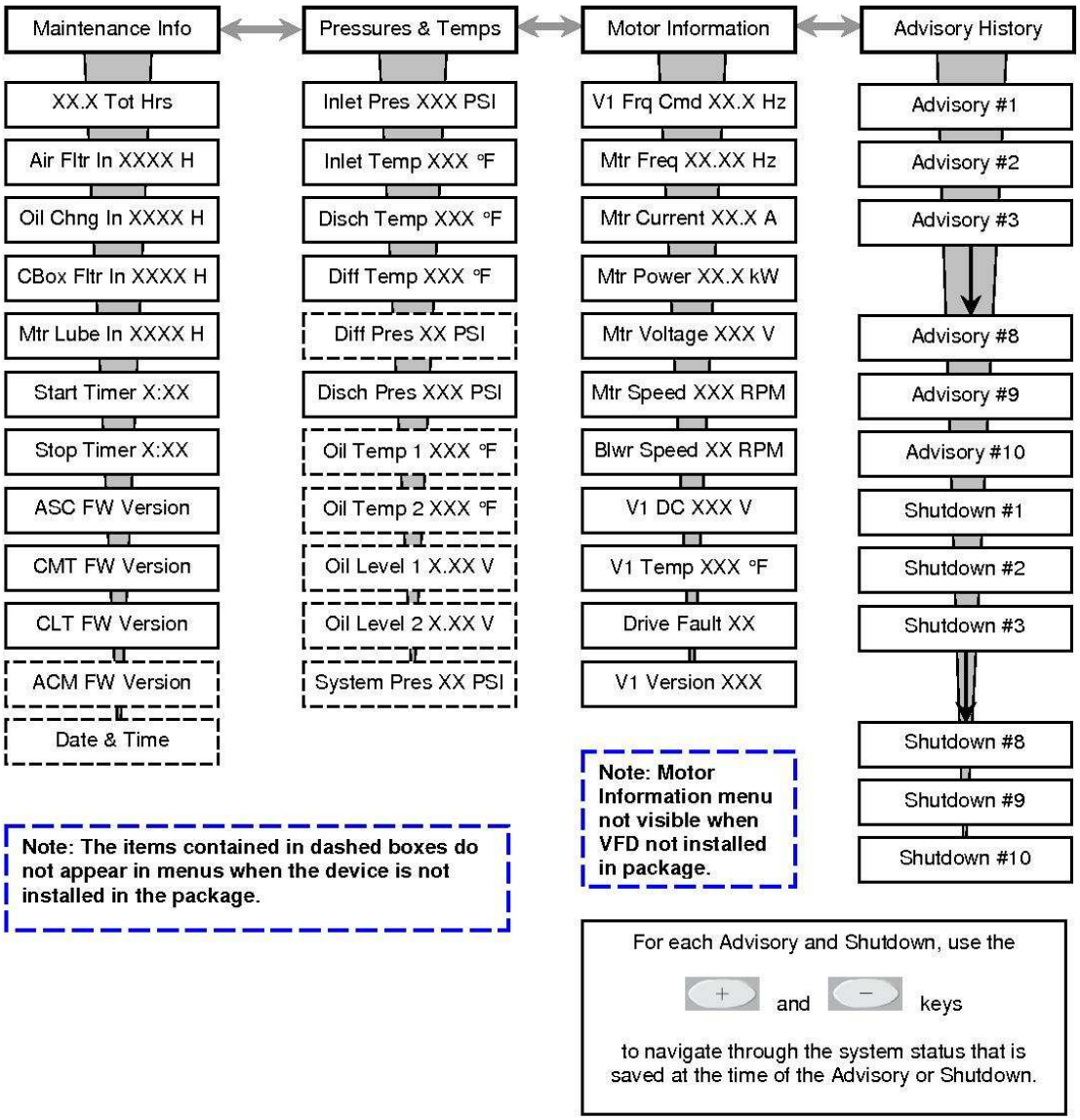
Use the ▲ ▼ keys to navigate through the vertical menu items.



AirSmart Controller Operational Menus (Blower Application)

Use the keys to navigate through the horizontal main menus. These keys are also used to exit the vertical menu items.

Use the keys to navigate through the vertical menu items.



Note: The items contained in dashed boxes do not appear in menus when the device is not installed in the package.

Note: Motor Information menu not visible when VFD not installed in package.

For each Advisory and Shutdown, use the + and − keys to navigate through the system status that is saved at the time of the Advisory or Shutdown.

3.1.1 Maintenance Info Menu

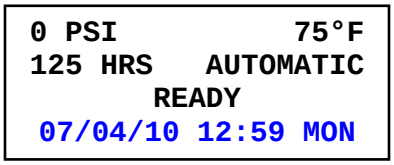
The Maintenance Menu gives the user access to the current status of all the maintenance counters and system timers.

1. ACM Firmware Version

When the AirSmart Communications Module (ACM) is installed, the version number of the firmware loaded in the module is displayed as the next to last item in the Maintenance Info menu.

2. Time and Date

The last item in the Maintenance Info Menu is the current time and date kept by the battery backed, real time clock on the Communications Module. The time and date can be changed under the Time Adjust menu.



The date & time format reads as follows:

YY/MM/DD HH:MM DOW

Where:
YY = Year
MM = Month
DD = Date
HH = Hour (using 24 hour clock)
MM = Minute
DOW = Day of week

3.2 Adjustment Menus

The Adjustment Menus are only available when the compressor or blower is stopped. To enter the Adjustment Menu tree, press the Enter button and then press the Right or Left buttons to access up to six different menus. Once the desired menu heading is shown in the second line of the display, press the Enter button again to access that menu. Use the Up and Down buttons to access the individual items in the selected menu, which are also shown in the second line of the display.

It is not necessary to navigate back to the top of a particular menu in order to enter another menu. Simply press the Stop/Reset button to go back to the heading of the current menu and then use the Right or Left buttons again to find the desired menu heading as described above.

To completely exit from the Adjustment menus, press the Stop/Reset button again. If parameter changes have been made, the following screen will appear.

```
STORE MODIFIED
PARAMETERS?
  STOP = NO
 ENTER = YES
```

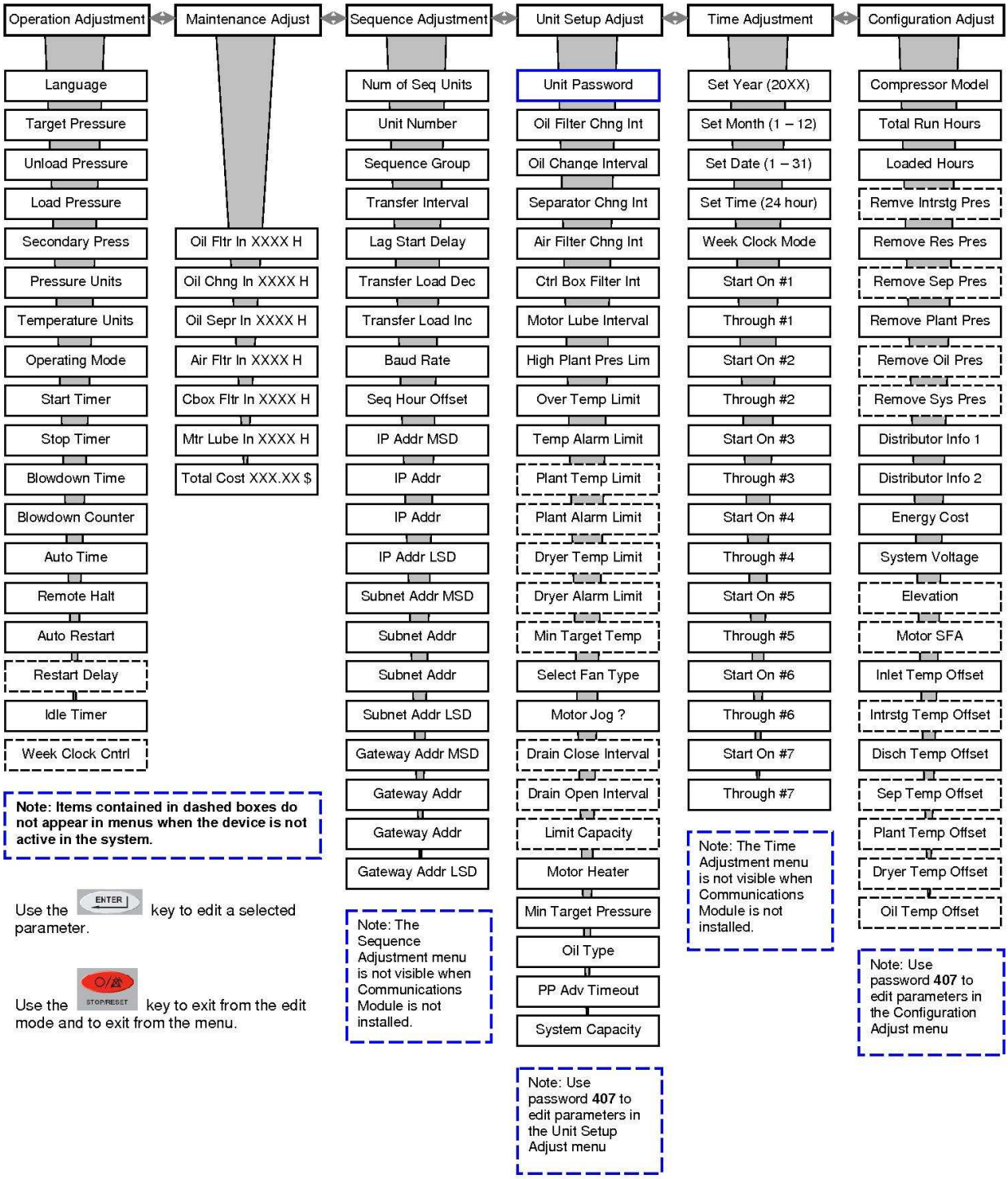
To permanently save the changes that were made, press the Enter button. If the Stop/Reset button is pressed, the parameter changes that have been made are still valid but will be lost the next time the compressor is disconnected from main power.

- *Note: Only the information associated with the Communications Module is shown below. For a full listing of other menu items, refer to the AirSmart Controller User's Manual, Gardner Denver document 13-17-600 for the compressor application or IQ-7-200 for the blower application.*

AirSmart Controller Adjustment Menus (Compressor Application)

Use the ENTER key to enter the Adjustment menus (compressor must be stopped). Use the ◄ ► keys to navigate through the horizontal main menus.

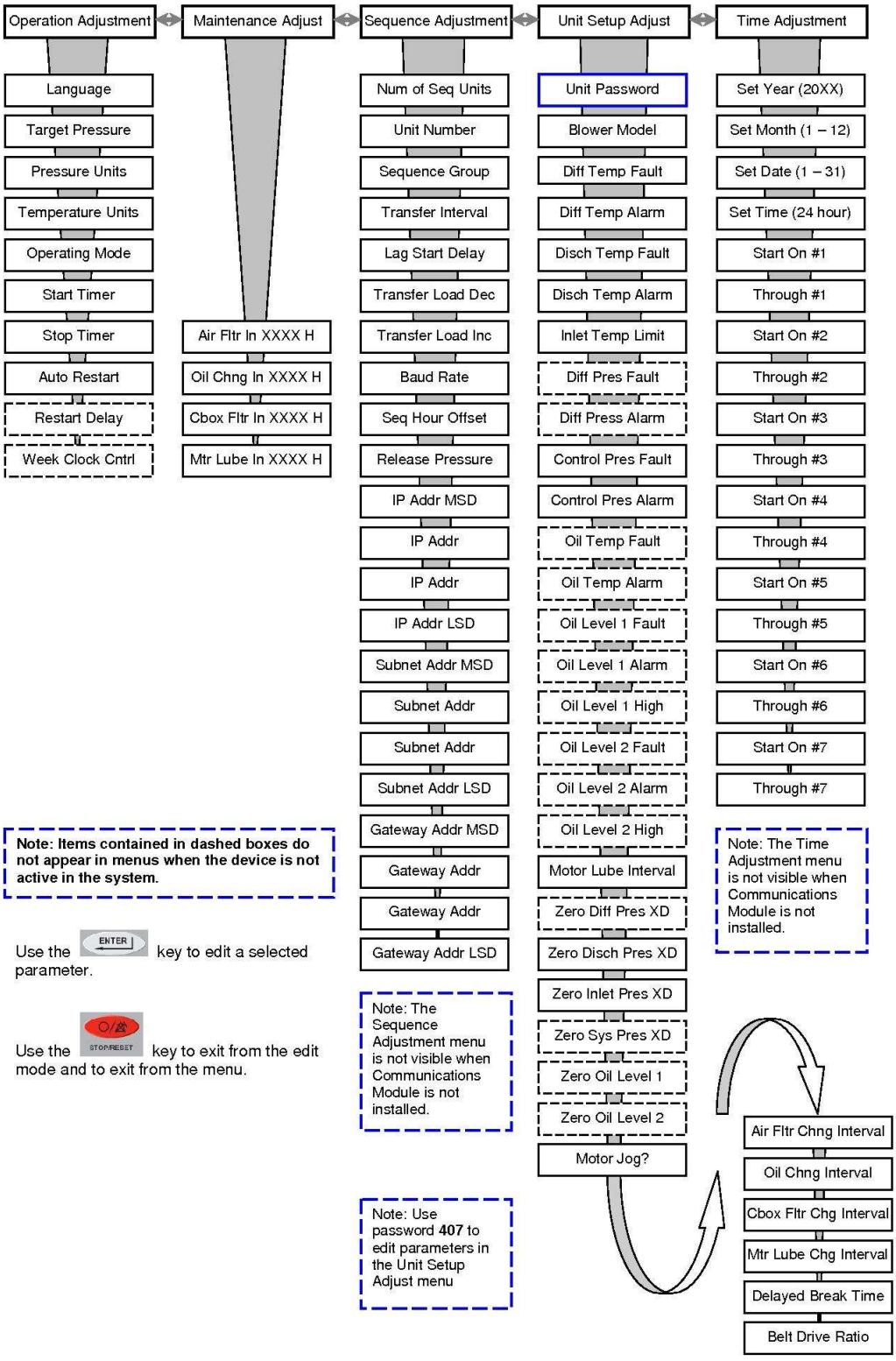
Use the ENTER key again to select the horizontal menu item. Use the ▲ ▼ keys to navigate through the vertical menu items.



AirSmart Controller Adjustment Menus (Blower Application)

Use the ENTER key to enter the Adjustment menus (compressor must be stopped). Use the ◄ ► keys to navigate through the horizontal main menus.

Use the ENTER key again to select the horizontal menu item. Use the ▲ ▼ keys to navigate through the vertical menu items.



Note: Items contained in dashed boxes do not appear in menus when the device is not active in the system.

Use the ENTER key to edit a selected parameter.

Use the O/⊘ STOP/RESET key to exit from the edit mode and to exit from the menu.

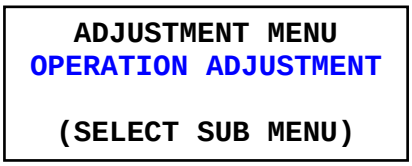
Note: The Sequence Adjustment menu is not visible when Communications Module is not installed.

Note: Use password **407** to edit parameters in the Unit Setup Adjust menu

Note: The Time Adjustment menu is not visible when Communications Module is not installed.

3.2.1 Operation Adjustment Menu

The Operation Adjustment menu provides access to the parameters that control the basic operation of the compressor or blower.



1. Operating Mode

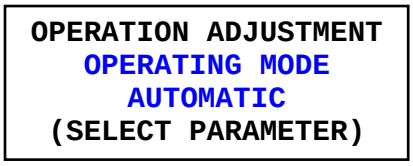
Under the Operation Adjustment menu is the operating mode. The controller can be set to one of four operational modes.

AUTOMATIC: (Default mode) the compressor or blower uses its internal modulation algorithms to control the operation of the machine. Refer to the appropriate AirSmart Users manual for machine operation in Automatic mode (Gardner Denver document 13-17-600 for the compressor application or IQ-7-200 for the blower application).

SEQUENCE: The compressor or blower operates similar to Automatic mode but is part of a sequenced group of machines.

LOW DEMAND: (compressor application only – refer to Gardner Denver document 13-17-600).

CONSTANT: (compressor application only – refer to Gardner Denver document 13-17-600).



2. Week Clock Control

The last item in the Operation Adjustment menu is the Week Clock Control function. When the Week Clock Control is turned on, the compressor or blower can be started and stopped using the seven programmable timers under the Time Adjust menu.

```
OPERATION ADJUSTMENT
WEEK CLOCK CONTROL
        ON
(SELECT PARAMETER)
```

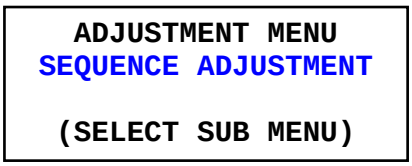
Default Value: OFF

DANGER

Automatic starting of the compressor or blower can cause injury or death

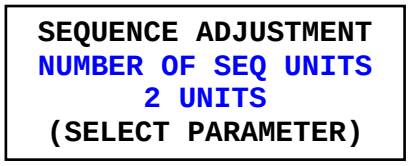
3.2.2 Sequence Adjustment Menu

The Sequence Adjustment menu provides access to the parameters that control the sequencing operation of the compressor or blower. This menu is only visible if the AirSmart Communications Module is installed.



1. Number of Sequence Units

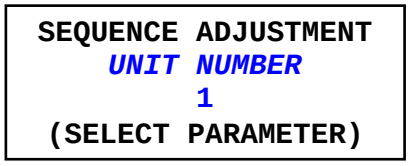
The first item in the Sequence Adjust menu is the Number of Sequence Units, which specifies the number of compressors or blower connected in a sequence group. For stand-alone operation, this parameter is set to 1. When set to 1, all other sequence related items in the menu are not visible.



Min Value: 1
Max Value: 8
Default Value: 1

2. Unit Number

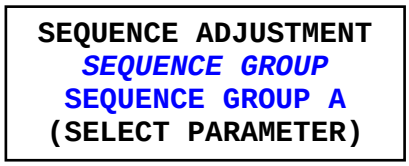
The next item in the Sequence Adjust menu is the Unit Number. A unique number must identify each of the possible eight units in a sequence group. The primary Lead, which is always the largest capacity compressor or blower in the group, must be programmed as Unit Number 1.



Min Value: 1
Max Value: 8
Default Value: 1

3. Sequence Group

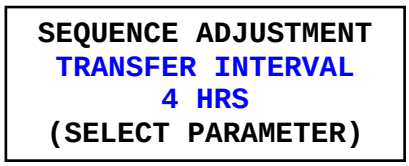
The next item in the Sequence Adjust menu is the Sequence Group, which simply identifies a group of up to eight machines for remote monitoring purposes. All compressors or blowers within a group must be set to the same group.



Min Value: SEQUENCE GROUP A
Max Value: SEQUENCE GROUP H
Default Value: SEQUENCE GROUP A

4. Transfer Interval

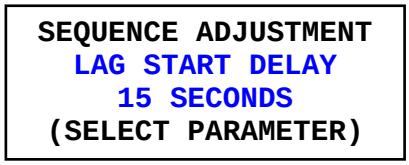
The next item in the Sequence Adjust menu is the Transfer Interval. This parameter controls how often the group Lead is transferred to a dormant compressor or blower during periods of low demand. This parameter is referenced to the Total Hour meter value as seen in the second line of the display or the Maintenance Info menu. A value of zero will disable this feature.



Min Value: 0 Hours
Max Value: 5000 Hours
Default Value: 4 Hours

5. Lag Start Delay

The next item in the Sequence Adjust menu is the Lag Start Delay timer value. This parameter controls the delay between The Transfer Load Increment trigger (see below) and the starting of the next available compressor or blower during periods of increasing demand. The Lag Start Delay time is reset and begins to count down whenever a dormant machine is brought on line. If the Lag Start Delay timer expires before the next available unit comes on line, there will be no delay during startup.



Min Value: 1 Second
Max Value: 60 Seconds
Default Value: 15 Seconds

6. Transfer Load Decrement

The next item in the Sequence Adjust menu is the Transfer Load Decrement value, which controls the load level the group must reach before dropping a compressor or blower from the sequence group during periods of decreasing demand.

```
SEQUENCE ADJUSTMENT
TRANSFER LOAD DEC
      35 %
(SELECT PARAMETER)
```

Note: Do not adjust this parameter unless it is absolutely necessary! The factory default value will provide the most efficient operation of the sequence group.

Min Value: 20%
Max Value: 100%
Default Value: 35% (variable speed compressor), 40% (variable speed blower), 100% (fixed speed compressor or blower)

7. Transfer Load Increment

The next item in the Sequence Adjust menu is the Transfer Load Increment value, which controls the load level the group must reach before adding a compressor or blower to the sequence group during periods of increasing demand.

```
SEQUENCE ADJUSTMENT
TRANSFER LOAD INC
      80 %
(SELECT PARAMETER)
```

Note: Do not adjust this parameter unless it is absolutely necessary! The factory default value will provide the most efficient operation of the sequence group.

Min Value: 70%
Max Value: 100%
Default Value: 80% (variable speed compressor or blower), 100% (fixed speed compressor or blower)

8. Baud Rate

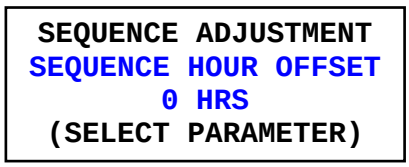
The next item in the Sequence Adjust controls the Baud Rate of the RS-232 port (9-pin D-Sub connector) used for remote monitoring.

```
SEQUENCE ADJUSTMENT
     BAUD RATE
       9600
(SELECT PARAMETER)
```

Baud Rate Values: 1200, 2400, 4800, 9600, 19200
Default Value: 9600

9. Sequence Hour Offset

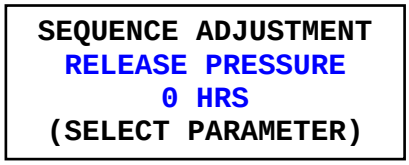
The next item in the Sequence Adjust menu is the Sequence Hour Offset. This parameter value is added to the Total Hour meter and allows two machines with large differences in Total Hour meter values to transfer the sequence lead using the Transfer Interval Timer.



Min Value: 0 Hours
Max Value: 87600 Hours
Default Value: 0 Hours

10. Release Pressure (Used in blower application only)

The next item in the Sequence Adjust menu is the Release Pressure value, which controls when a blower will be released from the sequence group during periods of decreasing demand. This parameter is used in an equivalent fashion as the Unload Pressure value in the compressor application.

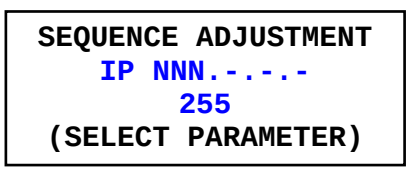


Min Value: 0 PSI
Max Value: Blower package dependant
Default Value: Blower package dependant

11. IP Address

The next four items in the Sequence Adjust menu make up the four octets (eight bit segments) of the IP (Internet Protocol) Address used by the Ethernet port for remote monitoring. The Communications Module does not support Dynamic Host Configuration Protocol (DHCP) so it is necessary for each unit to be programmed with a unique IP address.

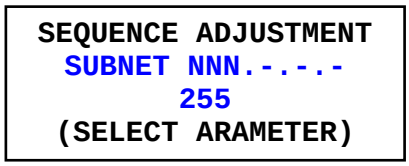
The LSB (Least Significant Byte) of the IP address also doubles as the Modbus RTU packet address when using the RS-232 port for remote monitoring.



Min Value: 0.0.0.0
Max Value: 255.255.255.255

12. Sub-Network Mask

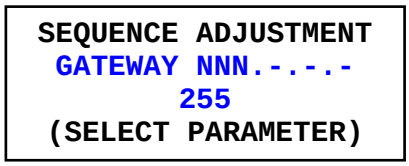
The next four items in the Sequence Adjust menu make up the four octets (eight bit segments) of the Sub-Network (Subnet) Mask used by the Ethernet port for remote monitoring. Contact the network administrator to obtain the value for the Subnet Mask.



Min Value: 0.0.0.0
Max Value: 255.255.255.255

13. Gateway Address

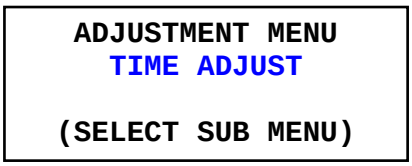
The next four items in the Sequence Adjust menu make up the four octets (eight bit segments) of the Gateway Address used by the Ethernet port for remote monitoring. A gateway is a device (usually a computer) that serves as an access point to other networks outside the local network. Contact the network administrator to obtain the network Gateway Address. A gateway address is only necessary for communications beyond the local network.



Min Value: 0.0.0.0
Max Value: 255.255.255.255

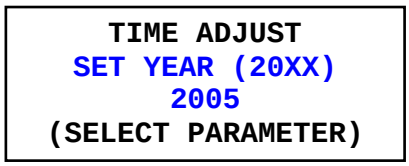
3.2.3 Time Adjustment Menu

The Time Adjustment menu provides access to the parameters that control the real time clock operation of the compressor or blower. This menu is only visible if the AirSmart Communications Module is installed.



1. Set Year

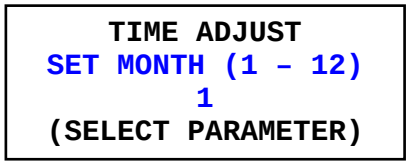
The first item in the Time Adjust menu is the year setting for the real time clock.



Min Value: 2000
Max Value: 2063

2. Set Month

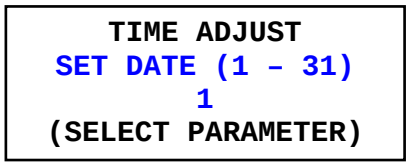
The next item in the Time Adjust menu is the month setting for the real time clock.



Min Value: 1
Max Value: 12

3. Set Date

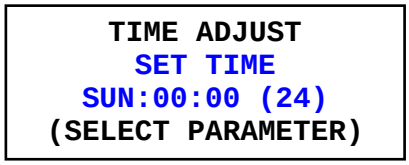
The next item in the Time Adjust menu is the date setting for the real time clock.



Min Value: 1
Max Value: 31

4. Set Time

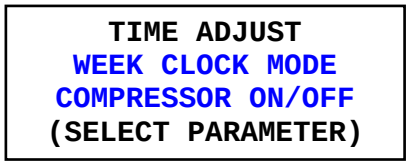
The next item in the Time Adjust menu is the time setting for the real time clock.



Day of Week range: SUN, MON, TUE, WED, THU, FRI, SAT
Hour range: 00 to 23
Minute range: 00 to 59

5. Week Clock Mode (Used in compressor application only)

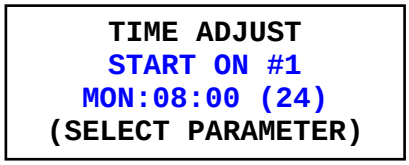
The next item in the Time Adjust menu is the Week Clock Mode setting which controls how the seven start/stop timers are used in the compressor application. Refer to the AirSmart User's manual for the compressor application (Gardner Denver document 13-17-600) for more information about using the secondary pressure settings.

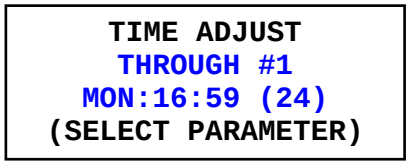


Min Value: COMPRESSOR ON/OFF
Max Value: SECONDARY PRESSURES

6. Start/Through Times 1 through 7

The next fourteen items in the Time Adjust menu make up the week clock for starting and stopping the compressor or blower up to seven times inside a period of one week. In order for the week clock to be active, Week Clock Control under the Operation Adjustment menu must set to ON. The START and THROUGH time parameters must be programmed as a pair, the compressor will not start at a designated START time if the associated THROUGH time parameter has not also been programmed.





Day of Week range: SUN, MON, TUE, WED, THU, FRI, SAT
Hour range: 00 to 23
Minute range: 00 to 59

The THROUGH time parameter tells the compressor to run through the programmed time and then stop. If the compressor is programmed to run through 16:59, as shown in the display above, the machine will actually stop at 17:00 (5:00 PM).

The concept of “through” time is used instead of stop time so that it is possible to have run periods that span from the week’s end through the week’s beginning. For example, with a START / THROUGH time of SAT: 23:00 / SUN: 00:59, the compressor will run exactly 120 minutes centered around midnight on Saturday

4 Using The Real Time Clock

The AirSmart Communications Module has a built-in battery-backed real time clock, which can be used to automatically start and stop a compressor or blower up to seven times inside of one week. The programmable week clock is similar that found in a home video recorder and used to record your favorite television programs. Follow the simple steps below for setting up the programmable week clock.

4.1 Programming the Real Time Clock

Program the year, month, date and time parameters using the first four pages of the Time Adjust menu as shown above. Once these values are set, they do not need to be entered again, even if the power is removed from the machine.

4.1.1 Program the Year

1. Press the Enter  key on the display to access the Adjustment menu tree.
2. Use the Left  or Right  keys to navigate to the Time Adjust menu.
3. Press the Enter  key to enter the Time Adjust menu.
4. The Year parameter will be the first item in the Time Adjust menu. Press the Enter  key to edit the Year.
5. Use the Plus  and Minus  keys the change the value of each digit.
6. Use the Left  or Right  keys to select individual digits.
7. Press the Enter  key to program the new Year value.

4.1.2 Program the Month

1. Press the Down  key once to access the Month parameter.
2. Press the  key to edit the Month.
3. Use the Plus  and Minus  keys the change the parameter value.
4. Press the  key to program the new Month value.

4.1.3 Program the Date

1. Press the Down  key once to access the Date parameter.
2. Press the Enter  key to edit the Month.
3. Use the Plus  and Minus  keys the change the parameter value.
4. Press the Enter  key to program the new Date value.

4.1.4 Program the Time

1. Press the Down  key once to access the Time parameter.
2. Press the Enter  key to edit the Time.
3. Use the Plus  and Minus  keys the change the day of the week or the value of each digit.
4. Use the Left  or Right  keys to select individual digits.
5. Press the Enter  key to program the new Date value.
6. Press the Stop/Reset  key twice to return to the Main display screen.

4.2 Programming Start/Trough Times

The Start/Trough times control when the compressor or blower will and stop during a period of one week. The next fourteen parameters after the Year, Month Date and Time are the seven Start/Through time pairs.

- **Important Note:** The START and THROUGH time parameters must be programmed as a pair, the compressor will not start at a designated START time if the associated THROUGH time parameter has not also been programmed.

4.2.1 Program the Start Time

1. Press the Enter ENTER key on the display to access the Adjustment menu tree.
2. Use Left ◄ or Right ► keys to navigate to the Time Adjust menu.
3. Press the Enter ENTER key to enter the Time Adjust menu.
4. The Year parameter will be the first item in the Time Adjust menu. Press the Down ▼ key until Start Time #1 shows in the display. If the Real Time Clock has just been set, you will only have to press the Down ▼ key once.
5. Press the Enter ENTER key to edit the Start time.
6. Use the Plus + and Minus – keys the change the day of the week or the value of each digit.
7. Use the Left ◄ or Right ► keys to select individual digits.
8. Press the Enter ENTER key to program the new Start time.

4.2.2 Program the Through Time

1. Press the Down ▼ key once to access the Through time #1 parameter.
2. Press the Enter ENTER key to edit the Through time.
3. Use the Plus + and Minus – keys the change the day of the week or the value of each digit.
4. Use the Left ◄ or Right ► keys to select individual digits.
5. Press the Enter ENTER key to program the new Date value.
7. Press the Stop/Reset STOP/RESET key twice.
8. Press the Enter ENTER key to permanently save the programmed parameters in the controller's memory.

4.2.3 Enable Week Clock Control

After programming the Start and Through times under the Time Adjust menu, it will be necessary to enable the Week Clock so that it may control the compressor or blower. The Week Clock enable is found under the Operation Adjustment menu.

Automatic starting of the compressor or blower can cause injury or death

1. Press the Enter ENTER key on the display to access the Adjustment Menu tree.
2. Use Left ◄ or Right ► keys to navigate to the Operation Adjustment menu.
3. Press the Enter ENTER key to enter the Operation Adjustment menu.
4. The Language setting will be the first item in the Operation Adjustment menu. Press the Up ▲ key once to get to Week Clock Control.
5. Press the Enter ENTER key to edit the Week Clock Control parameter.
6. Use the Up ▲ or Down ▼ keys to change the parameter from OFF to ON.
7. Press the Enter ENTER key to save the new setting.
8. Press the Stop/Reset STOP/RESET key twice.
9. Press the Enter ENTER key to permanently save the programmed parameters in the controller's memory.
10. To start the compressor or blower under Week Clock control, press the Run RUN key.

When the compressor is enabled to run under Week Clock control and the Run RUN key has been pressed, the display will appear as shown below. The third line of the display will show the next start time and the fourth line of the display will show the current time.

```
0 PSI          75°F
125 HRS    AUTOMATIC
START ON THU 08:00
08/12/15 13:45 WED
```

- **Important Note:** If the Week Clock Control is turned ON and there are no Start/Through times programmed, the machine will not start when the Run RUN key is pressed. Be sure that the Week Clock Control is turned OFF to operate the compressor or blower normally.
- **Important Note:** The Run RUN and Stop/Reset STOP/RESET keys will function normally when the Week Clock is operating inside of a Start/Through time window.

4.3 Real Time Clock Battery

The Real Time Clock on the AirSmart Communications Module is equipped with a backup battery, which enables the clock to keep time when the no power is applied to the AirSmart Controller. The battery that has been installed is a type CR2016 Lithium coin battery and has an expected life of ten years.

Should the battery become exhausted (clock no longer keeps time when power removed), it can be removed from its socket and replaced. First remove power from the compressor or blower. Next remove the Communications Module from the AirSmart Controller and replace the battery located on the backside of the module. Be sure to follow the instructions for replacement silk-screened onto the module circuit board cover.

5 Sequencing

The AirSmart Communications Module will allow up to eight compressors or blowers to be connected together in a sequence group. The Lead machine of the group will seamlessly start and stop other machines as necessary to meet the plant air demand. In order to equalize machine run time during periods of low system demand, the Lead machine can also trade with a dormant machine in the group.

A proper sequencing installation requires two or more compressors or blowers piped into a common air delivery system and connected as described in the sections to follow. For best results, connect each machine directly to a common manifold or receiver without any intervening dryers, filters or other restrictions. If any equipment must be installed on individual compressors or blowers, select equipment with as minimal of a pressure drop as possible. If filters are installed, establish a maintenance procedure to prevent clogged filters from upsetting the system. There should be no check valves or other devices, which isolate any member from the air system. During operation, be sure that any unit is taken off line before closing its service valve.

For compressor networks, the receiver should be sized to prevent excessive drops or rapid rises in pressure during operation. Note that “receiver” applies to the entire storage volume of a physical receiver and the air delivery pipe network installed in the plant. Sequenced systems of Gardner Denver VS/VST Series variable speed air compressors work best when the receiver size is at lest one-half gallon for the rated CFM of the entire sequence group.

All standard practices common to sound air compressor and blower installations such as proper sizing of piping, proper electrical supply, conductor sizing and grounding should be observed.

5.1 Sequencing Operation (Compressor application)

Each member compressor in a sequence group operates similarly to the Automatic mode of operation. It will start, load, modulate, unload, blowdown and automatically stop as necessary to meet the system demand for air. There are several differences, however, when running in the Sequence mode.

Normally, in Automatic mode, each compressor would respond to pressure changes seen at the discharge of each individual machine. In Sequence mode, each compressor responds to the system pressure as seen by the Lead compressor in the group. Each Lag compressor will be commanded by the group Leader to run the same percentage of full capacity. In other words, the Lag compressors do not use their own internal modulation algorithm to govern their speed. Instead, the Lead compressor dictates the operating speed of all compressors in the group based on the pressure seen at the system sample point on the receiver or manifold.

The Lead compressor will automatically show the system pressure in the fourth line of the display unless the operator chooses a different parameter from the front panel or an Advisory Fault needs to be displayed by the controller. The following sections describe the different possible scenarios during sequencing operation.

- **Important Note:** It is very important that the Target, Load and Unload pressure values under the Operation Adjustment menu are programmed identically in all members of a sequence group.

- **Important Note:** Fixed speed compressors that are equipped with an AirSmart Controller and a Communications Module can be added to any sequencing network, however, they will always operate at full speed (100%) when commanded to start.

5.1.1 Increasing Air Demand

As the plant demand for air increases, the speed of the Lead compressor will also increase to meet the demand. When the speed of the Lead compressor reaches the **Transfer Load Increment** value (usually 80%), it will not increase any further. If the demand continues to increase, the system pressure will drop below the **Load Pressure** value programmed into the Lead compressor and the next Lag compressor is brought on-line provided that the **Lag Start Delay** timer has expired. The Lag Start Delay timer begins counting down as soon as the Lead (or most recently started Lag) compressor begins modulation. As each Lag compressor is started, the operating speed of the sequence group decreases due to the increased air capacity of the sequence group. Each compressor in the group will be commanded by the Leader to run the same percentage of individual full speed regardless of compressor size. If the air demand continues to increase, the Lead will start another Lag machine when the group speed reaches the Transfer Load Increment value. When all possible Lag compressors are running, the speed of the sequence group is allowed to rise above the Transfer Load Increment value up to 100%.

5.1.2 Decreasing Air Demand

As the plant demand for air decreases, the speed of the sequence group will also decrease down to the **Transfer Load Decrement** value (usually 35%) and freeze. If the demand for air continues to decrease, the system pressure will increase until it reaches the **Unload Pressure** value programmed into the Lead compressor at which time the Lag machine with the largest **Unit Number** will be commanded to stop. As each Lag compressor is stopped, the operating speed of the sequence group increases due to the loss of total air capacity in the sequence group. As the air demand continues to decrease, the Lead will drop off all Lag compressors in a similar fashion until only the Lead compressor remains. After all Lag compressors have stopped, the Lead machine is allowed to operate below the Transfer Load Decrement level down to 20%.

5.1.3 Transfer of Lead Control

The transfer of lead control of the sequence group can occur in three different ways. The first method of control transfer occurs when the **Transfer Interval** parameter under the Sequence Adjust menu is set to an hour value other than zero. During long periods of low plant air demand when compressor(s) in the group are sitting idle, the Lead compressor will transfer its control to an equal sized Lag compressor after the Transfer Interval time elapses.

The second method of control transfer occurs when the operator presses the Stop/Reset button on the display panel stopping the current Lead compressor. In this case, control is transferred to the compressor with the next largest **Unit Number**, regardless of compressor size.

The third method of control transfer occurs when a shutdown fault stops the current Lead compressor. In this case, control is transferred to the compressor with the next largest **Unit Number**, regardless of compressor size.

5.2 Sequencing Operation (Blower application)

Each member blower in a sequence group operates similarly to the Automatic mode of operation. It will start, load, and automatically stop (lead machine will not stop) as necessary to meet the system demand for air. There are several differences, however, when running in the Sequence mode.

Normally, in Automatic mode, each blower would respond to pressure changes seen at the discharge or inlet of each individual machine. In Sequence mode, each blower responds to the system pressure as seen by the Lead blower in the group. Each Lag blower will be commanded by the group Leader to run the same percentage of full capacity. In other words, the Lag blowers do not use their own internal

modulation algorithm to govern their speed. Instead, the Lead blower dictates the operating speed of all blowers in the group based on the pressure seen at the system sample point on the manifold.

- **Important Note:** It is very important that the Target and Release pressure values under the Operation Adjustment and Sequence Adjustment menus are programmed identically in all members of a sequence group.

- **Important Note:** Fixed speed blowers that are equipped with an AirSmart Controller and a Communications Module can be added to any sequencing network, however, they will always operate at full speed (100%) when commanded to start.

5.2.1 Increasing Air Demand

As the plant demand for air increases, the speed of the Lead blower also increases to meet the demand. When the speed of the Lead blower reaches the **Transfer Load Increment** value (usually 80%), it will not increase any further. If the demand continues to increase, the system pressure will drop below the **Target Pressure** value programmed into the Lead blower and the next Lag blower is brought on-line provided that the **Lag Start Delay** timer has expired. The Lag Start Delay timer begins counting down as soon as the Lead (or most recently started Lag) blower begins modulation. As each Lag blower is started, the operating speed of the sequence group decreases due to the increased air capacity of the sequence group. Each blower in the group will be commanded by the Leader to run the same percentage of individual full speed regardless of blower size. If the air demand continues to increase, the Lead will start another Lag machine when the group speed reaches the Transfer Load Increment value. When all possible Lag blowers are running, the speed of the sequence group is allowed to rise above the Transfer Load Increment value up to 100%.

5.2.2 Decreasing Air Demand

As the plant demand for air decreases, the speed of the sequence group will also decrease down to the **Transfer Load Decrement** value (usually 40%) and freeze. If the demand for air continues to decrease, the system pressure will increase until it reaches the **Release Pressure** value programmed into the Lead blower at which time the Lag machine with the largest **Unit Number** will be commanded to stop. As each Lag blower is stopped, the operating speed of the sequence group increases due to the loss of total air capacity in the sequence group. As the air demand continues to decrease, the Lead will drop off all Lag blowers in a similar fashion until only the Lead blower remains. After all Lag compressors have stopped, the Lead machine is allowed to operate below the Transfer Load Decrement level down to 20%.

5.2.3 Transfer of Lead Control

The transfer of lead control of the sequence group can occur in three different ways. The first method of control transfer occurs when the **Transfer Interval** parameter under the Sequence Adjust menu is set to an hour value other than zero. During long periods of low plant air demand when blower(s) in the group are sitting idle, the Lead blower will transfer its control to an equal sized Lag blower after the Transfer Interval time elapses.

The second method of control transfer occurs when the operator presses the Stop/Reset button on the display panel stopping the current Lead blower. In this case, control is transferred to the blower with the next largest **Unit Number**, regardless of blower size.

The third method of control transfer occurs when a shutdown fault stops the current Lead blower. In this case, control is transferred to the blower with the next largest **Unit Number**, regardless of blower size.

5.3 Install Pressure Transducers

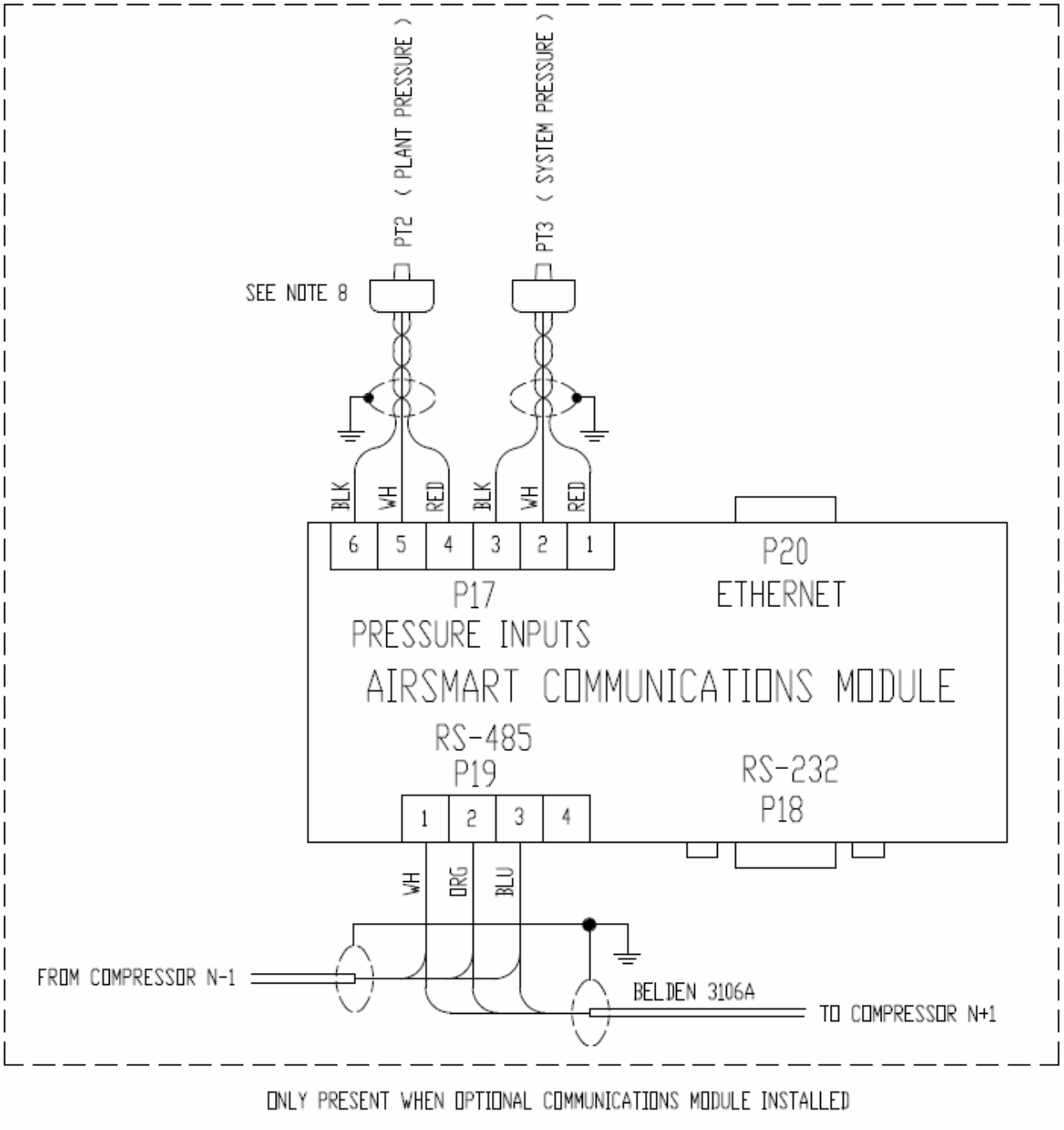


Figure 5 – Sequencing Connections

5.3.1 Install System Pressure Transducer

In order for the Communications Module to properly control the sequencing of multiple compressors or blowers, it requires an additional pressure reading from the air system receiver or manifold. Each member of the sequence group is to become a Lead machine is required to have a system pressure transducer so that lead control transfers can occur.

The transducer is installed into either the roof or the side of the control box or package. A typical compressor installation is shown in **Error! Reference source not found.** below. For a typical blower installation, see Figure 7. Refer to the Operators Manual of the machine being sequenced for the proper location. Item 2, in the figure below, is a weatherproof bulkhead (GDI Part No. 64EB368) in which the pressure transducer, item 3 (GDI Part No. VP1011577 for a compressor or VP1033786 for a blower) is installed. In addition, a ¼ inch pressure sample tube is connected from the plant air system receiver or manifold to the system pressure transducer in the control box.

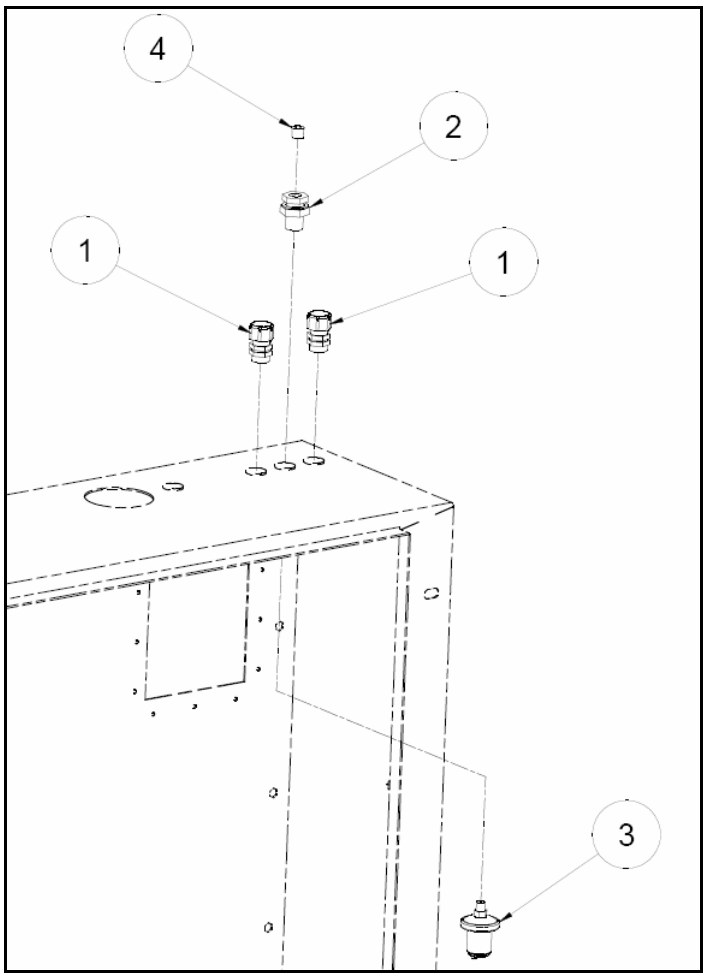


Figure 6 – Typical System Pressure Transducer Installation (Compressor)

The cable harness from the system pressure transducer is connected to pins 1 through 3 of connector P17 on the Communications Module as shown in Figure 5**Error! Reference source not found.** above.

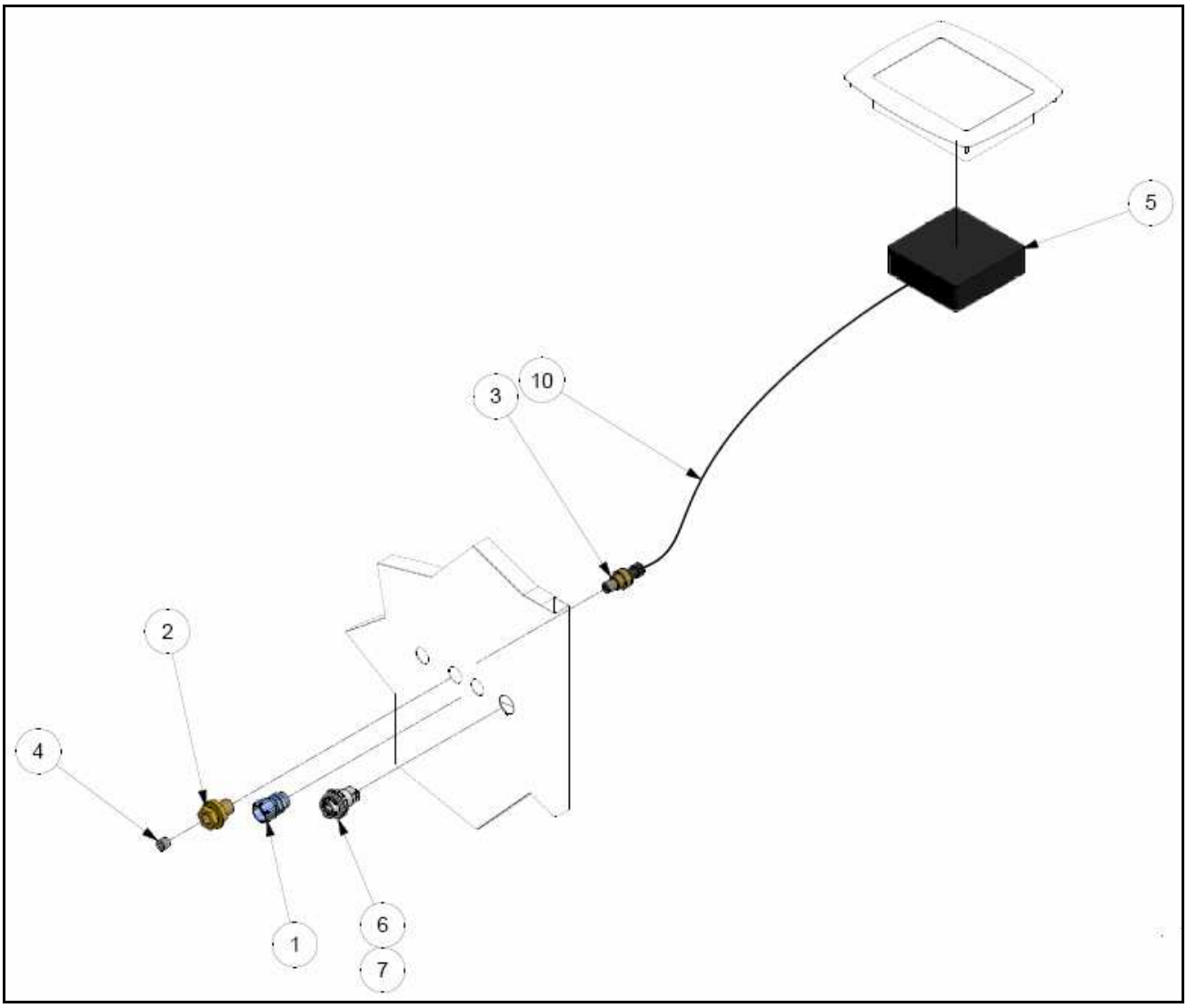


Figure 7 – Typical System Pressure Transducer Installation (Blower)

5.3.2 Move Plant Pressure Transducer Connection

The Plant Pressure transducer, which is already installed in the compressor or blower, must also be connected to the Communications Module in order to eliminate the error in the signal when used in a sequenced system. The Plant Pressure transducer is normally connected to pins 4 through 6 of connector P5 on a Value Controller or pins 7 through 9 of connector P14 on a Full-sized Controller. Move the Plant Pressure transducer connection to pins 4 through 6 of P17 on the Communications Module as shown in Figure 5 above. Be sure to observe the wire colors shown in Figure 5.

5.4 Configure Controller I/O Map

After installing the pressure transducers, the AirSmart Controller must be configured to read the new signals. Follow the steps below to configure the I/O map in the controller.

1. Press the Enter ENTER key on the display to access the Adjustment menu tree.
2. Use Left ◄ or Right ► keys to navigate to the Unit Setup Adjust menu.
3. Press the Enter ENTER key to enter the Unit Setup Adjust menu.
4. The Unit Password parameter will be the first item in the Unit Setup Adjust menu. Press the Enter ENTER key to change the Password to **8412**.
5. Use the Plus + and Minus − keys the change the value of each digit.
6. Use the Left ◄ or Right ► keys to select individual digits.
7. Press the Enter ENTER key to confirm the password value.
8. Press the Stop/Reset STOP/RESET key to return to the Adjustment menu tree.
9. Press the Right ► key twice to navigate to the Prog I/O Adjust menu.
10. Press the Enter ENTER key to access the Prog I/O Adjust menu.
11. Press the Up ▲ key to navigate to the System Pres Analog Input address. The display should read as shown below.

```
PROG I/O ADJUST
  SYSTEM PRES
  0 ANALOG IN
(SELECT PARAMETER)
```

12. Press the Enter ENTER key to change the System Pres Analog Input address to **113**.
13. Use the Plus + and Minus − keys the change the value of each digit.
14. Use the Left ◄ or Right ► keys to select individual digits.
15. Press the Enter ENTER key to confirm the address value.
16. Press the Up ▲ key to navigate to the Plant Pres Analog Input address. The display should read as shown below.(the I/O address shown may be different depending on machine type)

PROG I/O ADJUST PLANT PRES 35 ANALOG IN (SELECT PARAMETER)

17. Press the Enter ENTER key to change the Plant Pres Analog Input address to **114**
18. After changing the address, press the Enter ENTER key to confirm the address value.
19. Press the Stop/Reset STOP/RESET key twice.
20. Press the Enter ENTER key to permanently save the programmed parameters in the controller's memory.

- **Important Note: DO NOT** change any other I/O address parameters or the controller and compressor will not operate correctly.

5.5 Install Communications Network

The final step in the sequencing setup is to install the communications network so that the Lead compressor or blower can communicate with and control the Lag machines. **Error! Reference source not found.** shows a typical control box installation where item 1 is a weatherproof bulkhead (GDI Part No. 24CA615) through which the network wires (Belden 3106A or equivalent – GDI Part No. 97J93) may pass. **Error! Reference source not found.** above shows the wire connections to connector P19 on the Communications Module.

Figure 8– Serial (P18) and Network (P19) Connectors

6 Remote Monitoring

Remote monitoring allows the user to observe the operation of the compressor or blower from a remote location using the serial and/or Ethernet connection on the Communications Module. The serial port uses the Modbus RTU protocol while the Ethernet port uses Modbus RTU over UDP/IP.

6.1 Modbus RTU over Serial Line

The Modbus RTU protocol used on the serial port uses Function code 0x03 (03 decimal) to read all the registers listed in the following pages. The Modbus address used to communicate with the Communications Module is equal to the least significant byte of the IP address set in the Sequencing Adjust menu. For more information about Modbus, the Modbus Application Protocol Specification can be downloaded free of charge at www.Modbus-IDA.org.

The following shows an example of reading Registers 1001 – 1005 from the Communications Module.

Query

Field Name	Decimal	Hexadecimal
Slave Address	IP Address LSB	0x--
Function Code	03	0x03
Starting Address High	03	0x03
Starting Address Low	233	0xE9
Number of Points High	00	0x00
Number of Points Low	05	0x05
CRC Low	--	0x--
CRC High	--	0x--

Response

Field Name	Decimal	Hexadecimal
Slave Address	IP Address LSB	0x--
Function Code	03	0x03
Byte Count	10	0x0A
Data High (Addr 1001)	11	0x0B
Data Low (Addr 1001)	208	0xD0
Data High (Addr 1002)	04	0x04
Data Low (Addr 1002)	176	0xB0
Data High (Addr 1003)	05	0x05
Data Low (Addr 1003)	80	0x50
Data High (Addr 1004)	12	0x0C
Data Low (Addr 1004)	48	0x30
Data High (Addr 1005)	12	0x0C
Data Low (Addr 1005)	128	0x80
CRC Low	--	0x--
CRC High	--	0x--

6.2 Modbus RTU over UDP/IP

The Modbus RTU protocol used on the Ethernet port is identical to that described in the serial port section above except that the Modbus data packet is wrapped inside of a UDP datagram before being sent over the network.

The Communications Module (server) automatically opens UDP port number 2001 for receiving data packets from the client. The client, in turn, must open UDP port number 2000 to receive data from the Communications Module. The Communications Module does not support Dynamic Host Configuration Protocol (DHCP) so it is necessary for each unit to be programmed with a unique IP address.

The response time for the Communications Module over Ethernet will be determined mostly by network traffic and how many network devices (switches, routers, etc.) the data must pass through. A typical response time over a local network is around two seconds.

Figure 9 – Pressure (P17) and Ethernet (P20) Connectors

6.3 Modbus Address Map (Compressor application)

Address	Parameter	Units / Range / Description	Data Type	Access
1000	Controller State	0x0000 = ADJUSTMENT 0x0100 = AUTO RESTART 0x0200 = SHUTDOWN 0x0300 = READY 0x0400 = ENABLED 0x0800 = START 0x0900 = PAUSE 0x0A00 = BLOWDOWN 0x0B00 = UNLOAD 0x0D00 = MODULATE 0x0E00 = NORMAL STOP 0x1000 = REMOTE HALT 0x1100 = SEQ SHUTDOWN 0x1200 = POWER ON RESET	unsigned short (16 bits)	Read Only
12000	Controller Status Flags 1	Use the following masks to isolate flag bits: 0x0001 = VALVE ACT COMM ERROR 0x0002 = ADVISORY ACTIVE 0x0004 = STOP KEY LATCH 0x0008 = CAME FROM MODULATE 0x0010 = BLOWDOWN LATCH 0x0020 = INTERNAL ERROR 0x0040 = AUTO ALTERNATE DISPLAY 0x0080 = FAN START RELAY 0x0100 = STATE TIMER EXPIRED 0x0200 = MOTORS RUNNING 0x0400 = LOADED 0x0800 = WRITE DECIHOUR COUNTER 0x1000 = EXP BRD COMM ERROR 0x2000 = DRIVE 1 COMM ERROR 0x4000 = DRIVE 2 COMM ERROR 0x8000 = DRIVE 3 COMM ERROR	unsigned short (16 bits)	Read Only

Address	Parameter	Units / Range / Description	Data Type	Access
12001	Controller Status Flags 2	Use the following masks to isolate flag bits: 0x0001 = DRIVE 2 AT FREQUENCY 0x0002 = CHECK DISCHARGE TEMP 0x0004 = EXP BRD NEEDED 0x0008 = RESET ALARM EDGE 0x0010 = LAST RESET ALARM 0x0020 = HVY CONSUM START EDGE 0x0040 = LAST HVY CONSUM START 0x0080 = HVY CONSUM LOAD EDGE 0x0100 = AUTO RESTART ENABLED 0x0200 = PROGRAM FLASH CRC OK 0x0400 = LANGUAGE TABLE CRC OK 0x0800 = EEPROM PARAMS RESTORED 0x1000 = EEPROM PARAMS RESET 0x2000 = BACKUP PARAMS UPDATED 0x4000 = ADC ERROR 0x8000 = DRIVE 1 AT FREQUENCY	unsigned short (16 bits)	Read Only
12002	Controller Status Flags 3	Use the following masks to isolate flag bits: 0x0001 = LAST MOTOR RUNNING 0x0002 = MANTENANCE ADVISORY 0x0004 = REMOTE LOAD ENABLE 0x0008 = REMOTE LOAD 0x0010 = REMOTE UNLOAD 0x0020 = VALVE ACT NEEDED 0x0040 = DRIVE1 AT MAX SPEED 0x0080 = IN MODULATION 0x0100 = LAST HVY CONSUM LOAD 0x0200 = MODEL TABLE VALID 0x0400 = INVALID LANGUAGE TABLE 0x0800 = SAVING EEPROM PARAMS 0x1000 = DRIVES BEING RESET 0x2000 = COMM MODULE INSTALLED 0x4000 = MOTORS JUST STARTED 0x8000 = MOTORS JUST STOPPED	unsigned short (16 bits)	Read Only

Address	Parameter	Units / Range / Description	Data Type	Access
12003	Controller Status Flags 4	Use the following masks to isolate flag bits: 0x0001 = DOUT ADVISORY ALARM 0x0002 = DOUT MANTENANCE ALARM 0x0004 = DOUT ANY ALARM 0x0008 = ALARM CHANGE PULSE 0x0010 = RTC SECONDARY PRESSURE 0x0020 = IV PID UNLOAD 0x0040 = RATE OF RISE EVENT 0x0080 = NOT USED 0x0100 = GOOD TO GO 0x0200 = GENERAL PURPOSE 1Hz 0x0400 = LOW DISCHARGE TEMP 0x0800 = RTC DRYER 0x1000 = RTC RUN 0x2000 = RTC STOP 0x4000 = MAINTENANCE CTRS RESET 0x8000 = RUNTIME EDIT PROGRESS	unsigned short (16 bits)	Read Only

Maintenance Information

Address	Parameter	Units / Range / Description	Data Type	Access
13000	Total Hours	LSB = 6 minutes (1/10 hour)	signed long (32 bits)	Read Only
13002	Loaded Hours	LSB = 6 minutes (1/10 hour)	signed long (32 bits)	Read Only
10050	Last Oil Change	**Total Hours** at last oil change.	signed long (32 bits)	Read Only
10052	Oil Change Interval	Units: Hours Min/Max: 1000 - 12000	signed short (16 bits)	Read Only
10053	Last Oil Filter Change	**Total Hours** at last oil filter change.	signed long (32 bits)	Read Only
10055	Oil Filter Change Interval	Units: Hours Min/Max: 100 - 4000	signed short (16 bits)	Read Only
10056	Last Oil Separator Change	**Total Hours** at last oil separator element change.	signed long (32 bits)	Read Only
10058	Oil Separator Change Interval	Units: Hours Min/Max: 1000 - 9000	signed short (16 bits)	Read Only
10059	Last Air Filter Change	**Total Hours** at last air filter change.	signed long (32 bits)	Read Only
10061	Air Filter Change Interval	Units: Hours Min/Max: 1000 - 4000	signed short (16 bits)	Read Only
10148	Last Control Box Filter Change	**Total Hours** at last control box filter change	signed long (32 bits)	Read Only
10150	Control Box Filter Change Interval	Units: Hours Min/Max: 400 - 1000	signed short (16 bits)	Read Only
10062	Last Motor Lube	**Total Hours** at last motor lubrication	signed long (32 bits)	Read Only
10064	Motor Lube Interval	Units: Hours Min/Max: 500 - 10000	signed short (16 bits)	Read Only
2057	Controller Firmware Version	Units: 1/100 (203 = version 2.03)	signed short (16 bits)	Read Only

Real Time Pressures and Temperatures

Address	Parameter	Units/Range	Data Type	Access
1001	Interstage Temperature	Units: 1/16 Deg. F Min/Max: 31 – 257 (x 16)	signed short (16 bits)	Read Only
1002	Inlet Temperature	Units: 1/16 Deg. F Min/Max: 31 – 257 (x 16)	signed short (16 bits)	Read Only
1003	Plant Temperature	Units: 1/16 Deg. F Min/Max: 31 – 257 (x 16)	signed short (16 bits)	Read Only
1004	Separator Temperature	Units: 1/16 Deg. F Min/Max: 31 – 257 (x 16)	signed short (16 bits)	Read Only
1005	Discharge Temperature	Units: 1/16 Deg. F Min/Max: 31 – 257 (x 16)	signed short (16 bits)	Read Only
1006	Dryer Temperature	Units: 1/16 Deg. F Min/Max: 31 – 257 (x 16)	signed short (16 bits)	Read Only
1007	Oil Temperature	Units: 1/16 Deg. F Min/Max: 31 – 257 (x 16)	signed short (16 bits)	Read Only
1008	Interstage Pressure	Units: 1/16 PSI Min/Max: 0 – 250 (x 16)	signed short (16 bits)	Read Only
1009	Inlet Pressure	Units: 1/16 PSI Min/Max: 0 – 250 (x 16)	signed short (16 bits)	Read Only
1010	Plant Pressure	Units: 1/16 PSI Min/Max: 0 – 250 (x 16)	signed short (16 bits)	Read Only
1011	Separator Pressure	Units: 1/16 PSI Min/Max: 0 – 250 (x 16)	signed short (16 bits)	Read Only
1012	Reservoir Pressure	Units: 1/16 PSI Min/Max: 0 – 250 (x 16)	signed short (16 bits)	Read Only
1013	Oil Pressure	Units: 1/16 PSI Min/Max: 0 – 250 (x 16)	signed short (16 bits)	Read Only
1014	System Pressure	Units: 1/16 PSI Min/Max: 0 – 250 (x 16)	signed short (16 bits)	Read Only

Variable Frequency Drive and Motor Parameters

Address	Parameter	Units/Range	Data Type	Access
2003	V1 Frequency Command	Units: 1/100 Hz VFD frequency command from controller.	signed short (16 bits)	Read Only
2004	V2 Frequency Command	Units: 1/100 Hz VFD frequency command from controller.	signed short (16 bits)	Read Only
2005	V3 Frequency Command	Units: 1/100 Hz VFD frequency command from controller.	signed short (16 bits)	Read Only
2006	V1 Status	Use the following masks to isolate status bits: 0x0001 = READY 0x0002 = RUNNING 0x0004 = COMMAND FWD 0x0008 = ROTATE FWD 0x0010 = ACCELERATING 0x0020 = DECELERATING 0x0040 = ALARM 0x0080 = FAULT 0x0100 = AT FREQUENCY 0x0200 = WARNING 0x0400 = NOT USED 0x0800 = NOT USED 0x1000 = DIN1 BIT 0x2000 = DIN2 BIT 0x4000 = NOT USED 0x8000 = NOT USED	unsigned short (16 bits)	Read Only
2007	V2 Status	See **V1 Status** bit masks above	unsigned short (16 bits)	Read Only
2008	V3 Status	See **V1 Status** bit masks above	unsigned short (16 bits)	Read Only
2009	V1 Fault Code	See VFD User's Manual for fault code listing.	signed short (16 bits)	Read Only
2010	V2 Fault Code	See VFD User's Manual for fault code listing.	signed short (16 bits)	Read Only
2011	V3 Fault Code	See VFD User's Manual for fault code listing.	signed short (16 bits)	Read Only
2012	V1 Actual Frequency	Units: 1/100 Hz Actual motor operating frequency.	signed short (16 bits)	Read Only

Address	Parameter	Units/Range	Data Type	Access
2013	V2 Actual Frequency	Units: 1/100 Hz Actual motor operating frequency.	signed short (16 bits)	Read Only
2014	V3 Actual Frequency	Units: 1/100 Hz Actual motor operating frequency.	signed short (16 bits)	Read Only
2018	V1 Current	Units: 1/10 Amp	signed short (16 bits)	Read Only
2019	V2 Current	Units: 1/10 Amp	signed short (16 bits)	Read Only
2020	V3 Current	Units: 1/10 Amp	signed short (16 bits)	Read Only
2021	V1 DC Bus Voltage	Units: Volts	signed short (16 bits)	Read Only
2022	V2 DC Bus Voltage	Units: Volts	signed short (16 bits)	Read Only
2023	V3 DC Bus Voltage	Units: Volts	signed short (16 bits)	Read Only
2024	V1 Motor Speed	Units: RPM	signed short (16 bits)	Read Only
2025	V2 Motor Speed	Units: RPM	signed short (16 bits)	Read Only
2026	V3 Motor Speed	Units: RPM	signed short (16 bits)	Read Only
2033	V1 Motor Power	Units: 1/10 kW	signed short (16 bits)	Read Only
2034	V2 Motor Power	Units: 1/10 kW	signed short (16 bits)	Read Only
2035	V3 Motor Power	Units: 1/10 kW	signed short (16 bits)	Read Only
2036	V1 Heat Sink Temperature	Units: Deg. C	signed short (16 bits)	Read Only
2037	V2 Heat Sink Temperature	Units: Deg. C	signed short (16 bits)	Read Only
2038	V3 Heat Sink Temperature	Units: Deg. C	signed short (16 bits)	Read Only
2048	V1 Firmware Version	See VFD User's Manual for data format.	signed short (16 bits)	Read Only
2049	V2 Firmware Version	See VFD User's Manual for data format.	signed short (16 bits)	Read Only
2050	V3 Firmware Version	See VFD User's Manual for data format.	signed short (16 bits)	Read Only
2054	V1 Motor Voltage	Units: Volts	signed short (16 bits)	Read Only
2055	V2 Motor Voltage	Units: Volts	signed short (16 bits)	Read Only

Address	Parameter	Units/Range	Data Type	Access
2056	V3 Motor Voltage	Units: Volts	signed short (16 bits)	Read Only
2074	V1 Motor Nameplate Volts	Units: Volts	signed short (16 bits)	Read Only
2075	V2 Motor Nameplate Volts	Units: Volts	signed short (16 bits)	Read Only
2076	V3 Motor Nameplate Volts	Units: Volts	signed short (16 bits)	Read Only
2077	V1 Motor Nameplate Hertz	Units: 1/100 Hz	signed short (16 bits)	Read Only
2078	V2 Motor Nameplate Hertz	Units: 1/100 Hz	signed short (16 bits)	Read Only
2079	V3 Motor Nameplate Hertz	Units: 1/100 Hz	signed short (16 bits)	Read Only
2080	V1 Motor Nameplate FLA	Units: 1/10 Amp	signed short (16 bits)	Read Only
2081	V2 Motor Nameplate FLA	Units: 1/10 Amp	signed short (16 bits)	Read Only
2082	V3 Motor Nameplate FLA	Units: 1/10 Amp	signed short (16 bits)	Read Only

Front Panel Display

Address	Parameter	Units/Range	Data Type	Access
4096	Front Panel LEDs	Use the following masks to isolate LED bits: 0x0001 = POWER 0x0002 = AUTOMATIC 0x0004 = SERVICE 0x0008 = SHUTDOWN	unsigned short (16 bits)	Read Only
4097 - 4106	Front Panel Display Line 1	20 characters / line 2 characters / 16-bit word	unsigned short (16 bits)	Read Only
4107 - 4116	Front Panel Display Line 2	20 characters / line 2 characters / 16-bit word	unsigned short (16 bits)	Read Only
4117 – 4126	Front Panel Display Line 3	20 characters / line 2 characters / 16-bit word	unsigned short (16 bits)	Read Only
4127 - 4136	Front Panel Display Line 4	20 characters / line 2 characters / 16-bit word	unsigned short (16 bits)	Read Only

Operational Settings

Address	Parameter	Units/Range	Data Type	Access
10000	Target Pressure Setting	Units: 1/16 PSI Min/Max: 45 – 250 (x 16)	signed short (16 bits)	Read Only
10001	Unload Pressure Setting	Units: 1/16 PSI Min/Max: 0 – 250 (x 16)	signed short (16 bits)	Read Only
10002	Load Pressure Setting	Units: 1/16 PSI Min/Max: 30 – 250 (x 16)	signed short (16 bits)	Read Only
10008	Operating Mode	0 = Constant, 1 = Automatic, 2 = Sequence	signed short (16 bits)	Read Only
10009	Compressor Type	0 = Fixed Speed, 1 = Variable Speed	signed short (16 bits)	Read Only
10034	Local Capacity	Units: CFM Min/Max: 0 - 5000	signed short (16 bits)	Read Only
10035 (LSB)	Remote Halt Enabled	Units: None Min/Max: 0 = OFF, 1 = ON	unsigned char (8 bits)	Read Only
10038 (MSB)	Auto Restart	Units: None Min/Max: 0 = OFF, 1 = ON	unsigned char (8 bits)	Read Only
10039 (LSB)	Oil Type	0 = Standard, 1 = High Temp 2 = Food Grade	unsigned char (8 bits)	Read Only
10042 (MSB)	Week Clock Enabled	Units: None Min/Max: 0 = OFF, 1 = ON	unsigned char (8 bits)	Read Only
10043	Blowdown Timer Setting	Units: Seconds Min/Max: 1 - 1200	unsigned short (16 bits)	Read Only
10044	Blowdown Counter Setting	Units: None Min/Max: 0 - 10	unsigned short (16 bits)	Read Only
10045	Auto Timer Setting	Units: 1/10 Minutes Min/Max: 0 - 200	unsigned short (16 bits)	Read Only
10046	Start Timer Setting	Units: Seconds Min/Max: 0 - 600	unsigned short (16 bits)	Read Only
10047	High Plant Pressure Limit	Units: 1/16 PSI Min/Max: 70 – 200 (x 16)	signed short (16 bits)	Read Only
10048	Over Temperature Shutdown Limit	Units: 1/16 Deg. F Min/Max: 175 - 240 (x 16)	signed short (16 bits)	Read Only
10049	Auto Restart Delay Time	Units: Seconds Min/Max: 5 - 30	signed short (16 bits)	Read Only
10065	System Voltage	Units: Volts Min/Max: 115 - 1000	signed short (16 bits)	Read Only
10067	Over Temperature Alarm Limit	Units: 1/16 Deg. F Min/Max: 175 - 240 (x 16)	signed short (16 bits)	Read Only

Address	Parameter	Units/Range	Data Type	Access
10068	Plant Temperature Shutdown Limit	Units: 1/16 Deg. F Min/Max: 122 - 176 (x 16)	signed short (16 bits)	Read Only
10069	Plant Temperature Alarm Limit	Units: 1/16 Deg. F Min/Max: 104 - 176 (x 16)	signed short (16 bits)	Read Only
10132	Dryer Temperature Shutdown Limit	Units: 1/16 Deg. F Min/Max: 50 - 250 (x 16)	signed short (16 bits)	Read Only
10133	Dryer Temperature Alarm Limit	Units: 1/16 Deg. F Min/Max: 50 - 250 (x 16)	signed short (16 bits)	Read Only
10137	Stop Timer Setting	Units: 1/10 Minutes Min/Max: 0 - 120	unsigned short (16 bits)	Read Only
10147	Idle Timer Setting	Units: 1/10 Minutes Min/Max: 0 - 120	unsigned short (16 bits)	Read Only
10151	Elevation	Units: Feet Min/Max: 0 - 30000	signed short (16 bits)	Read Only

Sequencing Settings

Address	Parameter	Units/Range	Data Type	Access
10003	Number of Sequenced Units	Units: None Min/Max: 1 – 8	signed short (16 bits)	Read Only
10004	Sequence Unit Number	Units: None Min/Max: 1 – 8	signed short (16 bits)	Read Only
10005	Sequence Group	Units: None Min/Max: 0 – 7 (A – H)	signed short (16 bits)	Read Only
10006	Transfer Interval	Units: Hours Min/Max: 0 – 5000	signed short (16 bits)	Read Only
10007	Lag Start Delay	Units: Seconds Min/Max: 1 - 60	signed short (16 bits)	Read Only
10025	Transfer Load Decrement	Units: % of Full Speed Min/Max: 20 - 100	signed short (16 bits)	Read Only
10026	Transfer Load Increment	Units: % of Full Speed Min/Max: 70 - 100	signed short (16 bits)	Read Only

Remote Monitoring Settings

Address	Parameter	Units/Range	Data Type	Access
10028	IP Address	Min/Max: 0x00000000 – 0xFFFFFFFF	signed short (x 2) (16 bits)	Read Only
10030	Subnet Mask	Min/Max: 0x00000000 – 0xFFFFFFFF	signed short (x 2) (16 bits)	Read Only
10032	Gateway Address	Min/Max: 0x00000000 – 0xFFFFFFFF	signed short (x 2) (16 bits)	Read Only

Shutdown / Advisory History

Address	Parameter	Units/Range	Data Type	Access
11000 - 11029	Shutdown Data Structure #1	See structure below		Read Only
11002 (MSB)	Shutdown Code	Refer to document No. 13-17-600 for Shutdown & Advisory codes	signed char (8 bits)	Read Only
11004	Interstage Temperature	Units: 1/16 Deg. F Min/Max: 31 – 257 (x 16)	signed short (16 bits)	Read Only
11005	Inlet Temperature	Units: 1/16 Deg. F Min/Max: 31 – 257 (x 16)	signed short (16 bits)	Read Only
11006	Plant Temperature	Units: 1/16 Deg. F Min/Max: 31 – 257 (x 16)	signed short (16 bits)	Read Only
11007	Separator Temperature	Units: 1/16 Deg. F Min/Max: 31 – 257 (x 16)	signed short (16 bits)	Read Only
11008	Discharge Temperature	Units: 1/16 Deg. F Min/Max: 31 – 257 (x 16)	signed short (16 bits)	Read Only
11009	Interstage Pressure	Units: 1/16 PSI Min/Max: 0 – 250 (x 16)	signed short (16 bits)	Read Only
11010	Inlet Pressure	Units: 1/16 PSI Min/Max: 0 – 250 (x 16)	signed short (16 bits)	Read Only
11011	Plant Pressure	Units: 1/16 PSI Min/Max: 0 – 250 (x 16)	signed short (16 bits)	Read Only
11012	Separator Pressure	Units: 1/16 PSI Min/Max: 0 – 250 (x 16)	signed short (16 bits)	Read Only
11013	Reservoir Pressure	Units: 1/16 PSI Min/Max: 0 – 250 (x 16)	signed short (16 bits)	Read Only
11014	Total Hours	LSB = 6 minutes (1/10 hour)	signed long (32 bits)	Read Only

Address	Parameter	Units/Range	Data Type	Access
11016	Real Time Stamp	32-bits of real time data as: YYYYYYMMMMTTTTTHHH HHNNNNNNDDDDDD Where: Y = 6 bits representing year 0 - 63 M = 4 bits representing month 1 - 12, T = 5 bits representing date 1 - 31, H = 5 bits representing hour 0 - 23, N = 6 bits representing minute 0 - 59, D = 6 bits representing day of week 1 - 7.	unsigned long (32 bits)	Read Only
11018	V1 Status	Use the following masks to isolate status bits: 0x0001 = READY 0x0002 = RUNNING 0x0004 = COMMAND FWD 0x0008 = ROTATE FWD 0x0010 = ACCELERATING 0x0020 = DECELERATING 0x0040 = ALARM 0x0080 = FAULT 0x0100 = AT FREQUENCY 0x0200 = WARNING 0x0400 = NOT USED 0x0800 = NOT USED 0x1000 = DIN1 BIT 0x2000 = DIN2 BIT 0x4000 = NOT USED 0x8000 = NOT USED	unsigned short (16 bits)	Read Only
11019	V1 Actual Frequency	Units: 1/100 Hz Actual motor operating frequency.	signed short (16 bits)	Read Only
11020	V1 Motor Speed	Units: RPM	signed short (16 bits)	Read Only
11021	V1 Current	Units: 1/10 Amp	signed short (16 bits)	Read Only
11022	V1 Heat Sink Temperature	Units: Deg. C	signed short (16 bits)	Read Only

Address	Parameter	Units/Range	Data Type	Access
11023	V1 DC Bus Voltage	Units: Volts	signed short (16 bits)	Read Only
11024	V2 Status	See **V1 Status** bit masks above	unsigned short (16 bits)	Read Only
11025	V2 Actual Frequency	Units: 1/100 Hz Actual motor operating frequency.	signed short (16 bits)	Read Only
11026	V2 Motor Speed	Units: RPM	signed short (16 bits)	Read Only
11027	V2 Current	Units: 1/10 Amp	signed short (16 bits)	Read Only
11028	V2 Heat Sink Temperature	Units: Deg. C	signed short (16 bits)	Read Only
11029	V2 DC Bus Voltage	Units: Volts	signed short (16 bits)	Read Only
11030 - 11059	Shutdown Data Structure #2	Same a **Shutdown #1** structure above		Read Only
11060 - 11089	Shutdown Data Structure #3	Same a **Shutdown #1** structure above		Read Only
11090 - 11119	Shutdown Data Structure #4	Same a **Shutdown #1** structure above		Read Only
11120 - 11149	Shutdown Data Structure #5	Same a **Shutdown #1** structure above		Read Only
11150 - 11179	Shutdown Data Structure #6	Same a **Shutdown #1** structure above		Read Only
11180 - 11209	Advisory Data Structure #1	Same a **Shutdown #1** structure above		Read Only
11210 - 11239	Advisory Data Structure #2	Same a **Shutdown #1** structure above		Read Only
11240 - 11269	Advisory Data Structure #3	Same a **Shutdown #1** structure above		Read Only
11270 - 11299	Advisory Data Structure #4	Same a **Shutdown #1** structure above		Read Only
11300 - 11329	Advisory Data Structure #5	Same a **Shutdown #1** structure above		Read Only
11330 - 11359	Advisory Data Structure #6	Same a **Shutdown #1** structure above		Read Only

6.4 Modbus Address Map (Blower application)

Address	Parameter	Units / Range / Description	Data Type	Access
1000	Controller State	0x0000 = ADJUSTMENT 0x0001 = POWER ON RESET 0x0004 = SHUTDOWN 0x0007 = REMOTE HALT 0x0008 = AUTO RESTART 0x000A = ENABLED 0x000B = READY 0x000C = START 0x000F = PAUSE 0x0010 = MODULATE 0x0012 = NORMAL STOP	unsigned short (16 bits)	Read Only
12000	Controller Status Flags 1	Use the following masks to isolate flag bits: 0x0001 = DELAY TIMER EXPIRED 0x0002 = MOTORS RUNNING 0x0004 = LOADED 0x0008 = WRITE DECIHOUR COUNTER 0x0010 = EXP BRD COMM ERROR 0x0020 = DRIVE1 COMM ERROR 0x0040 = NOT USED 0x0080 = NOT USED 0x0100 = NOT USED 0x0200 = ADVISORY ACTIVE 0x0400 = STOP SOURCE 0x0800 = NOT USED 0x1000 = AIR FILTER CLOGGED 0x2000 = INTERNAL ERROR 0x4000 = AUTO ALTERNATE DISPLAY 0x8000 = NOT USED	unsigned short (16 bits)	Read Only

Address	Parameter	Units / Range / Description	Data Type	Access
12001	Controller Status Flags 2	Use the following masks to isolate flag bits: 0x0001 = AUTO RESTART ENABLED 0x0002 = PROGRAM FLASH CRC OK 0x0004 = LANGUAGE TABLE CRC OK 0x0008 = EEPROM PARAMS RESTORED 0x0010 = EEPROM PARAMS RESET 0x0020 = BACKUP PARAMS UPDATED 0x0040 = ADC ERROR 0x0080 = DRIVE1 AT FREQUENCY 0x0100 = NOT USED 0x0200 = NOT USED 0x0400 = XB1 CALLED FOR 0x0800 = RESET ALARM EDGE 0x1000 = LAST RESET ALARM 0x2000 = STOP KEY STATE 0x4000 = NOT USED 0x8000 = NOT USED	unsigned short (16 bits)	Read Only
12002	Controller Status Flags 3	Use the following masks to isolate flag bits: 0x0001 = NOT USED 0x0002 = MODEL TABLE VALID 0x0004 = NOT USED 0x0008 = SAVING EEPROM PARAMS 0x0010 = DRIVES BEING RESET 0x0020 = COMM MODULE INSTALLED 0x0040 = NOT USED 0x0080 = NOT USED 0x0100 = NOT USED 0x0200 = NOT USED 0x0400 = NOT USED 0x0800 = NOT USED 0x1000 = NOT USED 0x2000 = NOT USED 0x4000 = NOT USED 0x8000 = IN MODULTAION	unsigned short (16 bits)	Read Only

Address	Parameter	Units / Range / Description	Data Type	Access
12003	Controller Status Flags 4	Use the following masks to isolate flag bits: 0x0001 = NOT USED 0x0002 = GENERAL PURPOSE 1Hz 0x0004 = NOT USED 0x0008 = NOT USED 0x0010 = RTC RUN 0x0020 = RTC STOP 0x0040 = MAINTENACE CNTR RESET 0x0080 = RUNTIME EDIT PROGRSS 0x0100 = DOUT ADVISORY ALARM 0x0200 = NOT USED 0x0400 = DOUT ANY ALARM 0x0800 = ALARM CHANGE PULSE 0x1000 = NOT USED 0x2000 = FAN RUNNING 0x4000 = ENTER TO CLR ADVISORY 0x8000 = VFD OVERCURRENT	unsigned short (16 bits)	Read Only

Maintenance Information

Address	Parameter	Units / Range / Description	Data Type	Access
13000	Total Hours	LSB = 6 minutes (1/10 hour)	signed long (32 bits)	Read Only
13002	Total Hours	LSB = 6 minutes (1/10 hour)	signed long (32 bits)	Read Only
10066	Oil Change Interval	Units: Hours Min/Max: 1000 - 12000	signed short (16 bits)	Read Only
14000	Last Oil Change	**Total Hours** at last oil change.	signed long (32 bits)	Read Only
10065	Air Filter Change Interval	Units: Hours Min/Max: 1000 - 4000	signed short (16 bits)	Read Only
14002	Last Air Filter Change	**Total Hours** at last air filter change.	signed long (32 bits)	Read Only
10068	Motor Lube Interval	Units: Hours Min/Max: 500 - 10000	signed short (16 bits)	Read Only
14004	Last Motor Lube	**Total Hours** at last motor lubrication	signed long (32 bits)	Read Only
10067	Control Box Filter Change Interval	Units: Hours Min/Max: 400 - 1000	signed short (16 bits)	Read Only
14006	Last Control Box Filter Change	**Total Hours** at last control box filter change	signed long (32 bits)	Read Only
2057	Controller Firmware Version	Units: 1/100 (203 = version 2.03)	signed short (16 bits)	Read Only

Real Time Pressures and Temperatures

Address	Parameter	Units/Range	Data Type	Access
1001	Inlet Temperature	Units: 1/16 Deg. F Min/Max: 15 – 250 (x 16)	signed short (16 bits)	Read Only
1002	Discharge Temperature	Units: 1/16 Deg. F Min/Max: 15 – 400 (x 16)	signed short (16 bits)	Read Only
1003	Enclosure Temperature	Units: 1/16 Deg. F Min/Max: 15 – 250 (x 16)	signed short (16 bits)	Read Only
1004	Drive End Oil Temperature	Units: 1/16 Deg. F Min/Max: 15 – 250 (x 16)	signed short (16 bits)	Read Only
1005	Gear End Oil Temperature	Units: 1/16 Deg. F Min/Max: 15 – 250 (x 16)	signed short (16 bits)	Read Only
1006	Discharge Pressure	Units: 1/16 PSI Min/Max: -15 – 35 (x 16)	signed short (16 bits)	Read Only
1007	Inlet Pressure	Units: 1/16 PSI Min/Max: -15 - 35 (x 16)	signed short (16 bits)	Read Only
1008	Differential Pressure	Units: 1/16 PSI Min/Max: 0 - 50 (x 16)	signed short (16 bits)	Read Only
1012	Drive End Oil Level	Units: Min/Max:	signed short (16 bits)	Read Only
1013	Gear End Oil Level	Units: Min/Max:	signed short (16 bits)	Read Only
1014	System Pressure	Units: 1/16 PSI Min/Max: -15 - 35 (x 16)	signed short (16 bits)	Read Only

Variable Frequency Drive and Motor Parameters

Address	Parameter	Units/Range	Data Type	Access
2003	V1 Frequency Command	Units: 1/100 Hz VFD frequency command from controller.	signed short (16 bits)	Read Only
2006	V1 Status	Use the following masks to isolate status bits: 0x0001 = READY 0x0002 = RUNNING 0x0004 = COMMAND FWD 0x0008 = ROTATE FWD 0x0010 = ACCELERATING 0x0020 = DECELERATING 0x0040 = ALARM 0x0080 = FAULT 0x0100 = AT FREQUENCY 0x0200 = WARNING 0x0400 = NOT USED 0x0800 = NOT USED 0x1000 = DIN1 BIT 0x2000 = DIN2 BIT 0x4000 = NOT USED 0x8000 = NOT USED	unsigned short (16 bits)	Read Only
2009	V1 Fault Code	See VFD User's Manual for fault code listing.	signed short (16 bits)	Read Only
2012	V1 Actual Frequency	Units: 1/100 Hz Actual motor operating frequency.	signed short (16 bits)	Read Only
2018	V1 Current	Units: 1/10 Amp	signed short (16 bits)	Read Only
2021	V1 DC Bus Voltage	Units: Volts	signed short (16 bits)	Read Only
2024	V1 Motor Speed	Units: RPM	signed short (16 bits)	Read Only
2033	V1 Motor Power	Units: 1/10 kW	signed short (16 bits)	Read Only
2036	V1 Heat Sink Temperature	Units: Deg. C	signed short (16 bits)	Read Only
2048	V1 Firmware Version	See VFD User's Manual for data format.	signed short (16 bits)	Read Only
2054	V1 Motor Voltage	Units: Volts	signed short (16 bits)	Read Only

Address	Parameter	Units/Range	Data Type	Access
2074	V1 Motor Nameplate Volts	Units: Volts	signed short (16 bits)	Read Only
2077	V1 Motor Nameplate Hertz	Units: 1/100 Hz	signed short (16 bits)	Read Only
2080	V1 Motor Nameplate FLA	Units: 1/10 Amp	signed short (16 bits)	Read Only

Front Panel Display

Address	Parameter	Units/Range	Data Type	Access
4096	Front Panel LEDs	Use the following masks to isolate LED bits: 0x0001 = POWER 0x0002 = AUTOMATIC 0x0004 = SERVICE 0x0008 = SHUTDOWN	unsigned short (16 bits)	Read Only
4097 - 4106	Front Panel Display Line 1	20 characters / line 2 characters / 16-bit word	unsigned short (16 bits)	Read Only
4107 - 4116	Front Panel Display Line 2	20 characters / line 2 characters / 16-bit word	unsigned short (16 bits)	Read Only
4117 – 4126	Front Panel Display Line 3	20 characters / line 2 characters / 16-bit word	unsigned short (16 bits)	Read Only
4127 - 4136	Front Panel Display Line 4	20 characters / line 2 characters / 16-bit word	unsigned short (16 bits)	Read Only

Operational Settings

Address	Parameter	Units/Range	Data Type	Access
10000	Target Pressure Setting	Units: 1/16 PSI Min/Max: 45 – 250 (x 16)	signed short (16 bits)	Read Only
10008	Operating Mode	0 = Constant, 1 = Automatic, 2 = Sequence	signed short (16 bits)	Read Only
10009	Blower Type	0 = Fixed Speed, 1 = Variable Speed	signed short (16 bits)	Read Only
10010	Start Timer Setting	Units: Seconds Min/Max: 0 - 600	unsigned short (16 bits)	Read Only
10011	Stop Timer Setting	Units: Seconds Min/Max: 0 - 600	unsigned short (16 bits)	Read Only
10034	Local Capacity	Units: CFM Min/Max: 0 - 5000	signed short (16 bits)	Read Only
10038	Differential Temp Fault Limit	Units: 1/16 Deg. F Min/Max: 0 - 250 (x 16)	signed short (16 bits)	Read Only
10039	Differential Temp Alarm Limit	Units: 1/16 Deg. F Min/Max: 0 - 250 (x 16)	signed short (16 bits)	Read Only
10040	Discharge Temp Fault Limit	Units: 1/16 Deg. F Min/Max: 0 - 350 (x 16)	unsigned short (16 bits)	Read Only
10041	Discharge Temp Alarm Limit	Units: 1/16 Deg. F Min/Max: 0 - 350 (x 16)	unsigned short (16 bits)	Read Only
10042	Enclosure Temp Fault Limit	Units: 1/16 Deg. F Min/Max: 15 - 250 (x 16)	unsigned short (16 bits)	Read Only
10043	Enclosure Temp Alarm Limit	Units: 1/16 Deg. F Min/Max: 15 - 250 (x 16)	unsigned short (16 bits)	Read Only
10044	Inlet Temp High Limit	Units: 1/16 Deg. F Min/Max: 15 -150 (x 16)	unsigned short (16 bits)	Read Only
10045	Inlet Temp Low Fault Limit	Units: 1/16 Deg. F Min/Max: 15 -150 (x 16)	signed short (16 bits)	Read Only
10046	Inlet Temp Low Alarm Limit	Units: 1/16 Deg. F Min/Max: 15- 150 (x 16)	signed short (16 bits)	Read Only
10047	Differential Pres Fault Limit	Units: 1/16 PSI Min/Max: 0 – 50 (x 16)	signed short (16 bits)	Read Only
10048	Differential Pres Alarm Limit	Units: 1/16 PSI Min/Max: 0 – 50 (x 16)	signed short (16 bits)	Read Only
10049	Control Pressure Fault Limit	Units: 1/16 PSI Min/Max: 0 – 20 (x 16)	signed short (16 bits)	Read Only
10050	Control Pressure Alarm Limit	Units: 1/16 PSI Min/Max: 0 – 20 (x 16)	signed short (16 bits)	Read Only

Address	Parameter	Units/Range	Data Type	Access
10051	Oil Temperature Fault Limit	Units: 1/16 Deg. F Min/Max: 15 - 350 (x 16)	signed short (16 bits)	Read Only
10052	Oil Temperature Alarm Limit	Units: 1/16 Deg. F Min/Max: 15 - 350 (x 16)	signed short (16 bits)	Read Only
10053	Drive End Low Oil Level Fault limit	Units: Min/Max:	signed short (16 bits)	Read Only
10054	Drive End Low Oil Level Alarm limit	Units: Min/Max:	unsigned short (16 bits)	Read Only
10055	Drive End High Oil Level Fault limit	Units: Min/Max:	unsigned short (16 bits)	Read Only
10056	Gear End Low Oil Level Fault limit	Units: Min/Max:	signed short (16 bits)	Read Only
10057	Gear End Low Oil Level Alarm limit	Units: Min/Max:	unsigned short (16 bits)	Read Only
10058	Gear End High Oil Level Fault limit	Units: Min/Max:	signed short (16 bits)	Read Only

Sequencing Settings

Address	Parameter	Units/Range	Data Type	Access
10004	Sequence Unit Number	Units: None Min/Max: 1 – 8	signed short (16 bits)	Read Only
10005	Sequence Group	Units: None Min/Max: 0 – 7 (A – H)	signed short (16 bits)	Read Only
10006	Transfer Interval	Units: Hours Min/Max: 0 – 5000	signed short (16 bits)	Read Only
10007	Lag Start Delay	Units: Seconds Min/Max: 1 - 60	signed short (16 bits)	Read Only
10020	Number of Sequence Units	Units: None Min/Max: 1 – 8	signed short (16 bits)	Read Only
10025	Transfer Load Decrement	Units: % of Full Speed Min/Max: 20 - 100	signed short (16 bits)	Read Only
10026	Transfer Load Increment	Units: % of Full Speed Min/Max: 70 - 100	signed short (16 bits)	Read Only
10027	Release Pressure Setting	Units: 1/16 PSI Min/Max: -15 – 35 (x 16)	signed short (16 bits)	Read Only

Remote Monitoring Settings

Address	Parameter	Units/Range	Data Type	Access
10028	IP Address	Min/Max: 0x00000000 – 0xFFFFFFFF	signed short (x 2) (16 bits)	Read Only
10030	Subnet Mask	Min/Max: 0x00000000 – 0xFFFFFFFF	signed short (x 2) (16 bits)	Read Only
10032	Gateway Address	Min/Max: 0x00000000 – 0xFFFFFFFF	signed short (x 2) (16 bits)	Read Only

Shutdown / Advisory History

Address	Parameter	Units/Range	Data Type	Access
11000 - 11017	Shutdown Data Structure #1	See structure below		Read Only
11000 (MSB)	Shutdown Code	Refer to document No. IQ-7-200 for Shutdown & Advisory codes	signed char (8 bits)	Read Only
11001	Not used		signed short (16 bits)	Read Only
11002	Inlet Temperature	Units: 1/16 Deg. F Min/Max: 15 – 250 (x 16)	signed short (16 bits)	Read Only
11003	Discharge Temperature	Units: 1/16 Deg. F Min/Max: 15 – 400 (x 16)	signed short (16 bits)	Read Only
11004	Discharge Pressure	Units: 1/16 PSI Min/Max: -15 – 35 (x 16)	signed short (16 bits)	Read Only
11005	Inlet Pressure	Units: 1/16 PSI Min/Max: -15 - 35 (x 16)	signed short (16 bits)	Read Only
11006	Differential Pressure	Units: 1/16 PSI Min/Max: 0 – 50 (x 16)	signed short (16 bits)	Read Only
11007	Total Hours	LSB = 6 minutes (1/10 hour)	signed long (32 bits)	Read Only
11009	Real Time Stamp	32-bits of real time data as: YYYYYYMMMMTTTTTHHHHHNNNNNNDDDDDD Where: Y = 6 bits representing year 0 - 63 M = 4 bits representing month 1 - 12, T = 5 bits representing date 1 - 31, H = 5 bits representing hour 0 - 23, N = 6 bits representing minute 0 - 59, D = 6 bits representing day of week 1 - 7.	unsigned long (32 bits)	Read Only

Address	Parameter	Units/Range	Data Type	Access
11011	V1 Status	Use the following masks to isolate status bits: 0x0001 = READY 0x0002 = RUNNING 0x0004 = COMMAND FWD 0x0008 = ROTATE FWD 0x0010 = ACCELERATING 0x0020 = DECELERATING 0x0040 = ALARM 0x0080 = FAULT 0x0100 = AT FREQUENCY 0x0200 = WARNING 0x0400 = NOT USED 0x0800 = NOT USED 0x1000 = DIN1 BIT 0x2000 = DIN2 BIT 0x4000 = NOT USED 0x8000 = NOT USED	unsigned short (16 bits)	Read Only
11012	V1 Actual Frequency	Units: 1/100 Hz Actual motor operating frequency.	signed short (16 bits)	Read Only
11013	V1 Motor Speed	Units: RPM	signed short (16 bits)	Read Only
11014	V1 Current	Units: 1/10 Amp	signed short (16 bits)	Read Only
11015	V1 Heat Sink Temperature	Units: Deg. C	signed short (16 bits)	Read Only
11016	V1 DC Bus Voltage	Units: Volts	signed short (16 bits)	Read Only
11017	Not Used		unsigned short (16 bits)	Read Only
11018 - 11035	Shutdown Data Structure #2	Same a **Shutdown #1** structure above		Read Only
11036 - 11053	Shutdown Data Structure #3	Same a **Shutdown #1** structure above		Read Only
11054 - 11071	Shutdown Data Structure #4	Same a **Shutdown #1** structure above		Read Only
11072 - 11089	Shutdown Data Structure #5	Same a **Shutdown #1** structure above		Read Only
11090 - 11107	Shutdown Data Structure #6	Same a **Shutdown #1** structure above		Read Only

Address	Parameter	Units/Range	Data Type	Access
111108 - 11125	Shutdown Data Structure #7	Same a **Shutdown #1** structure above		Read Only
11126 - 11143	Shutdown Data Structure #8	Same a **Shutdown #1** structure above		Read Only
11144 - 11161	Shutdown Data Structure #9	Same a **Shutdown #1** structure above		Read Only
11162 - 11179	Shutdown Data Structure #10	Same a **Shutdown #1** structure above		Read Only
11180 - 11197	Advisory Data Structure #1	Same a **Shutdown #1** structure above		Read Only
11198 - 11215	Advisory Data Structure #2	Same a **Shutdown #1** structure above		Read Only
11216 - 11233	Advisory Data Structure #3	Same a **Shutdown #1** structure above		Read Only
11234 - 11251	Advisory Data Structure #4	Same a **Shutdown #1** structure above		Read Only
11252 - 11269	Advisory Data Structure #5	Same a **Shutdown #1** structure above		Read Only
11270 - 11287	Advisory Data Structure #6	Same a **Shutdown #1** structure above		Read Only
11288 - 11305	Advisory Data Structure #7	Same a **Shutdown #1** structure above		Read Only
11306 - 11323	Advisory Data Structure #8	Same a **Shutdown #1** structure above		Read Only
11324 - 11341	Advisory Data Structure #9	Same a **Shutdown #1** structure above		Read Only
11342 - 11359	Advisory Data Structure #10	Same a **Shutdown #1** structure above		Read Only

Gardner Denver

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