Gardner Denver

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Modbus Communications

AirSmart™ G2 Controller

INSTRUCTION MANUAL

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INSTRUCTIONS FOR ORDERING REPAIR PARTS

When ordering parts, specify Compressor MODEL, Method of Cooling, HORSEPOWER and SERIAL NUMBER (see nameplate on unit). The Airend Serial Number is also stamped on top of the discharge bearing carrier casting.

All orders for Parts should be placed with the nearest authorized distributor.

Where NOT specified, quantity of parts required per compressor or unit is one (1); where more than one is required per unit, quantity is indicated in parenthesis. SPECIFY EXACTLY THE NUMBER OF PARTS REQUIRED.

DO NOT ORDER BY SETS OR GROUPS.

To determine the Right-Hand and Left-Hand side of a compressor, stand at the motor end and look toward the compressor. Right-Hand and Left- Hand are indicated in parenthesis following the part name, i.e. (RH) and (LH), when appropriate.

WARNING – PROHIBITION – MANDATORY LABEL INFORMATION

Gardner Denver Rotary Screw compressors 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 compressor 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, <u>COULD</u> result in death or serious injury.

Asphyxiation Hazard ¯ Poisonous Fumes or Toxic Gases in Compressed Air

⚠CAUTION

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

Burn Hazard ¯ Hot surface

PROHIBITION/MANDATORY ACTION REQUIREMENTS

Do not Operate Compressor with Guard Removed

Lockout Electrical Equipment in De-Energized State

Do Not Lift Equipment with Hook ¯ No Lift Point

Loud Noise Hazard ¯ Wear Ear 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 will result in injury to or death of personnel.

- **Keep fingers and clothing away from rotating fan, drive coupling, etc.**
- **Disconnect the compressor unit from its power source, lockout and tagout 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 compressor 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 tagout and check for voltage before working on the control.**

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

- **Stop the unit if any repairs or adjustments on or around the compressor 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.**

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SECTION 1
INTRODUCTION

This manual describes the connections, configuration, and register mapping for communicating to the AirSmartù G2 controller over Modbus protocol. The AirSmartù G2 supports Modbus monitoring using Modbus RTU over RS-485 and Modbus TCP/IP over Ethernet. Note that the AirSmartù G2 Modbus interfaces support monitoring only and will not allow any data to be written over this link. For remote control of the compressor or blower, hardwired I/O must be used.

The AirSmartù G2 is used in both compressor and blower applications. Register maps for both applications are provided in a single table in this manual.

1.1 Requirements

1.1.1 Firmware Version

The required firmware version for Modbus support is version **2.21.0**. Contact Gardner Denver if you have a previous firmware version in order to obtain a firmware update.

1.1.2 Hardware Version

All versions of the AirSmartù G2 hardware support Modbus monitoring over RS-485. However, early versions do not support Modbus TCP/IP over Ethernet. If you have a controller with a serial number less than 4000 and require use of the Modbus TCP/IP interface, contact Gardner Denver. Controllers with serial number 4000 and greater will have a decal with the serial number and Ethernet MAC address on the back of the controller.

SECTION 2
COMMUNICATIONS SETTINGS

Communicating with the AirSmartù G2 over Modbus requires first configuring the controller to match the local serial or Ethernet network. Settings for Modbus applications can be found in the *Communications* menu of the Controller. The path to the *Communications* menu is:

Home ⟶ *Main Menu* ⟶ *Machine Configuration* ⟶ *Communications*

The *Communications* menu is broken down into seven adjustable parameters: Baud Rate, Stop Bits, Parity, Modbus ID, IP Address, Subnet Mask, and Gateway Address as shown in Figure 2.1. The following sections detail the adjustment of these parameters.

Figure 2.1: Communications Menu

2.1 Baud Rate

The first item in the Communications menu is the **Baud Rate** of the RS-485 port used for Modbus communication. The baud rate indicates the speed at which information transfer will occur in pulses per second.

Values: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Default: 9600

2.2 Stop Bits

The next item in the *Communications* menu is the **Stop Bits** setting. This varies the number of stop bits used for Modbus communication on the RS-485 port. Note: This parameter rarely needs to be changed. If you are unsure of the correct setting, leave set to *1*.

Values: 1, 2
Default: 1

2.3 Parity

The next item in the *Communications* menu is the **Parity** setting. This enables and varies the type of parity used to check data reception and transmission on the RS-485 port. Note: This parameter rarely needs to be changed. If you are unsure of the correct setting, leave set to *None.*

Values: None, Even, Odd
Default: None

2.4 Modbus ID

The next item in the *Communications* menu is the **Modbus ID**. This parameter only affects RS-485 communication. Note that the Modbus ID must be unique on the Modbus RTU network.

Values: 1-255
Default: 1

2.5 IP Address

The next item in the *Communications* menu is the **IP Address**. A number pad allows the user to input the desired IP Address for the specific machine. Figure 2.2 shows the controller display for inputting the desired IP address.

If the value of one of the octets of the address is only one or two digits, zeroes must be used as placeholders for digits that are not used. For example, if `1_ is the desired value of an octet, enter `001_ as shown in Figure 2.2. Note that the dots between each octet of the address are entered automatically; do not enter them on the keypad. Using the address shown in Figure 2.2, the sequence of selections on the number pad is as follows:

1 9 2 1 6 8 0 0 2 0 0 1 followed by *Enter*.

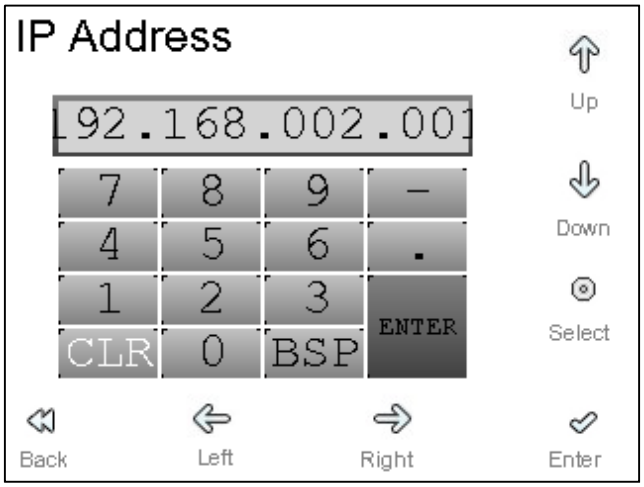

Figure 2.2: **IP Address Input Screen**

2.6 Subnet Mask

The next item in the *Communications* menu is the **Subnet Mask**. A number pad allows the user to input the desired Subnet Mask. Refer to the description under the **IP Address** section above for details on how to enter the desired address using the number pad.

2.7 Gateway Address

The next item in the *Communications* menu is the **Gateway Address**. A number pad allows the user to input the desired Gateway Address. Refer to the description under the **IP Address** section above for details on how to enter the desired address using the number pad.

SECTION 3
MODBUS MONITORING

Modbus is a serial messaging protocol that enables communication between a master controller and slave devices using pre-defined function codes. It is simple to implement and reliable, and is a widely used communication protocol in many applications including industrial automation.

For more information on Modbus, the Modbus Application Protocol Specification can be downloaded free of charge at: http://www.modbus.org/specs.php.

This section provides information on the supported functions and technical features of the Modbus interface on the AirSmartù G2.

3.1 Supported Operating Modes

The AirSmartù G2 is a Modbus slave device only. A device operating as a Modbus master must be present on the network to communicate with the controller. Modbus slave devices must be sent a valid request or `Poll_ for data from the Modbus master in order to transmit data on the network.

3.2 Implemented Requests

The AirSmartù G2 controller recognizes both broadcast and unicast Modbus requests as defined in the Modbus specification. However, because all registers on the AirSmartù G2 are read-only, no action will be taken in response to a broadcast request.

3.3 Supported Function Codes

The AirSmartù G2 utilizes a single Modbus function code:
03 (0x03) Read Holding Registers
All accessible controller data is transferred through the holding registers as defined in the register map given in this document.

3.4 Network Support

The AirSmartù G2 supports Modbus communication over the following networks:

1) Modbus RTU over RS-485 serial network
2) Modbus TCP/IP over Ethernet

Information on each interface is described in detail in the sections below.

3.4.1 Modbus RTU over RS-485

The AirSmartù G2 supports the Modbus RTU protocol over a two-wire RS-485 serial interface. RS-485 is a serial interface according to the EIA/TIA-485 standard utilizing balanced differential pair signaling over twisted pair cables. An RS-485 topology is implemented using a series of point-to-point nodes.

3.4.1.1 Cable Requirements

The two-wire RS-485 interface requires a cable with three conductors: two for balanced bidirectional data and one common reference connection. Gardner Denver recommends using a high-quality shielded twisted pair cable such as Belden 3106A, available under Gardner Denver part number **97J93**.

3.4.1.2 Controller Connections

The first three connections of Port P9 on the AirSmartù G2 Controller are used for connecting to the Modbus RTU network. The RS-485 positive data line is connected to pin 1 (A[1]), the negative data line is connected to pin 2 (B[1]), and the common line is connected to pin 3 (GND) as shown in Figure 3.1. Note that not all RS-485 devices will follow the same convention for labeling the A and B data lines, always check that the positive (non-inverting) and negative (inverting) data lines are connected consistently across all nodes on the RS-485 bus. It is important to make sure that the common connection is shared across all devices on the network and is referenced to digital ground.

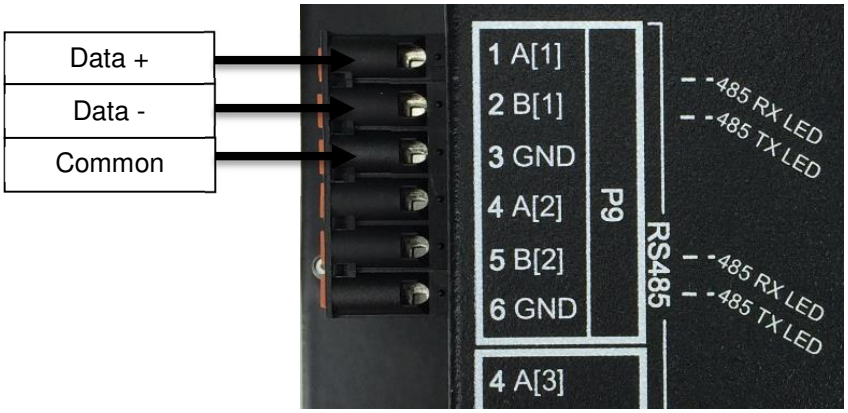

Figure 3.1: AirSmart G2 RS-485 Connections (P9)

3.4.1.3 System Topology and Requirements

A typical RS-485 multipoint system is limited to a maximum of 32 devices on the network without a repeater. Devices should be connected in a direct point-to-point (daisy-chain) network with stubs kept as short as possible. Figure 3.2 illustrates a typical 2-wire RS-485 bus.

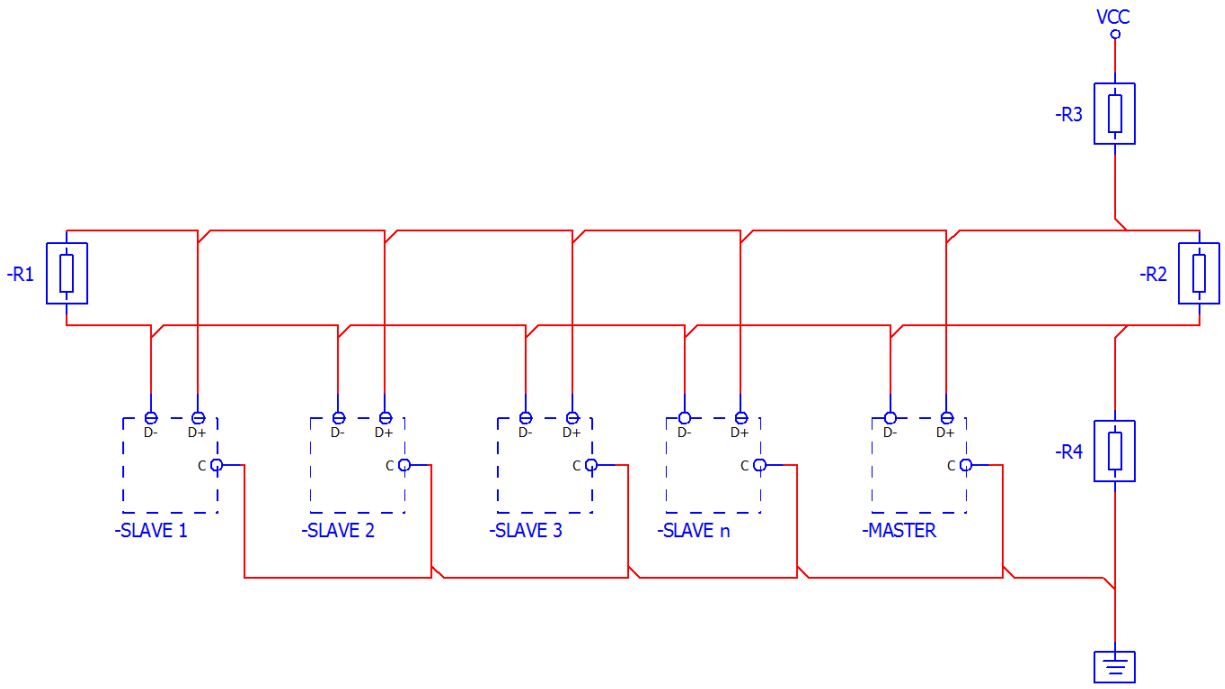

Figure 3.2: RS-485 Network Topology

Line termination between the differential lines is required on the two endpoints of the bus as shown in Figure 3.2 with resistors R1 and R2. A 120 ohm resistor is recommended for each of these terminating resistors. It is important that the termination is placed at the endpoints of the bus.

The RS-485 data lines must be properly biased to establish a steady voltage when the bus is not being driven by any device on the network. Without this, the bus can float and will be vulnerable to external interference. Resistors R3 and R4 in Figure 3.2 show the required biasing.

- R3 Acts as a pull-up resistor to VCC for the positive data line (D+). VCC is recommended to be 5VDC.

- R4 acts as a pull-down resistor to ground for the negative data line (D-).

- The recommended value for both R3 and R4 is 650 ohms.

3.4.1.4 Messaging Format

Modbus RTU messaging uses a pre-defined message format for request and response for each function code. The master request includes a slave address, function code, function data, and CRC. The slave response (in unicast messaging) includes the slave address, function code, function data, and CRC as defined in Table 3.1.

Table 3.1: Modbus RTU Fields

Field	Description
Slave address	Address of the target device. 0: Broadcast, 1-247: Unique slave address
Function code	Predefined function code. 0x03 (Read holding registers) is the only code supported in this application.
Function data	Predefined data for the function code request or response. For function 0x03, the request contains the starting address and number of registers. The response contains the byte count followed by register data.
CRC	Cyclic Redundancy Check used for error checking on the message data.

The following example shows the request sent from the Modbus master to read registers number 40030-40033 (holding registers number 30-33) from the controller at slave address 1. The response shows the data sent from the controller back to the Modbus master device in reply. Note that starting address is sent as 29 to read holding register number 30 since register addresses are numbered starting at 0 and register numbers are numbered starting at 1.

Request

Field Name	Decimal	Hexadecimal
Slave Address	01	0x01
Function Code	03	0x03
Starting Address High	00	0x00
Starting Address Low	29	0x1D
Number of Points High	00	0x00
Number of Points Low	04	0x04
CRC Low	--	0x--
CRC High	--	0x--

Response

Field Name	Decimal	Hexadecimal
Slave Address	01	0x01
Function Code	03	0x03
Byte Count	08	0x08
Data High (Addr 40030)	05	0x05
Data Low (Addr 40030)	20	0x14
Data High (Addr 40031)	04	0x04
Data Low (Addr 40031)	236	0xEC
Data High (Addr 40032)	00	0x00
Data Low (Addr 40032)	40	0x28
Data High (Addr 40033)	04	0x04
Data Low (Addr 40033)	226	0xE2
CRC Low	--	0x--
CRC High	--	0x--

3.4.2 Modbus TCP/IP

Modbus TCP/IP protocol is used to facilitate communication with the AirSmartù G2 over Ethernet networks. In general, Modbus TCP/IP allows for greater range, capacity, bandwidth, and reliability than traditional Modbus RTU implementations. However, the Ethernet network infrastructure for Modbus TCP/IP is more costly than RS-485.

3.4.2.1 Cable Requirements

Standard Ethernet patch cables of type Category 5 (CAT5), Category 5e, or Category 6 are acceptable for use with the AirSmartù G2 Modbus TCP/IP interface. Due to the harsh environments and possible electrical interference that may be present at the site, Gardner Denver recommends using a high-quality shielded cable.

A pre-terminated 100ft CAT5e cable is available under Gardner Denver part number **97J110**. Insulation Displacement RJ45 connectors are also available for easy field-termination of cables under Gardner Denver part number **24CA7401**.

For direct connection to another Ethernet device, such as a laptop, an Ethernet crossover cable may be used rather than a straight-through (patch) cable, but this is not required. The AirSmartù G2 supports Auto MDI-X on the Ethernet port and will reconfigure the interface accordingly if a direct connection is detected.

3.4.2.2 Controller Connections

The Ethernet connection on the AirSmartù G2 used for Modbus TCP/IP is labeled P1 as shown in Figure 3.3. This port is located on the top of the controller when mounted in a control panel. The Ethernet port on the AirSmartù G2 is a standard RJ45 jack with Speed and Activity LEDs. The port supports 10BASE-T and 100BASE-TX network speeds and will Autonegotiate to the highest performance connection supported by the network.

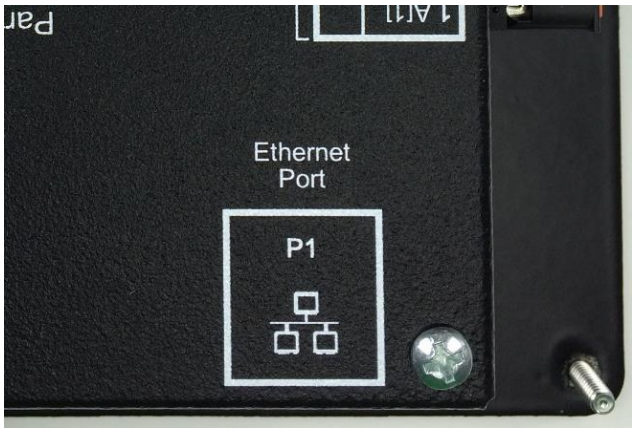

Figure 3.3: AirSmart G2 Ethernet Port (P1)

3.4.2.3 System Topology and Requirements

Modbus TCP/IP operates over a standard Ethernet network and shares the same physical network requirements. A star network topology is used with an active hub or switch providing a dedicated connection to each node or connected network.

Modbus TCP/IP uses a reserved port **502** for communication on the TCP/IP Network. All Modbus TCP/IP connections to the AirSmartù G2 must be made through port **502**.

Note that the AirSmartù G2 Controller does not support Dynamic Host Configuration Protocol (DHCP), so it is necessary for each controller to be programmed with a unique static IP address that has been reserved on the subnetwork to which the unit will be connected.

3.4.2.4 Messaging Format

TCP/IP is a connection-oriented network protocol with built-in flow control and error checking. Modbus TCP/IP takes advantage of the characteristics of the TCP/IP stack and relies on TCP/IP for tasks such as error-checking and addressing. Table 3.2 illustrates the Modbus request that would then be encapsulated in a TCP packet.

Table 3.2: Modbus TCP/IP Message Fields

	Field	Description
Header	Transaction ID High	Used to associate the response with the request.
	Transaction ID Low	
	Protocol ID	Must be 0
	Length	Size of the Modbus response
	Unit ID	Not used (value of 0x0 or 0xFF) unless target device is a Modbus serial device on a network connected through a Modbus TCP/IP gateway. In that case, the Unit ID should be set to the Modbus ID of the target device on the connected Modbus serial network.
Modbus Request	Function Code	Predefined function code. 0x03 (Read holding registers) is the only code supported in this application.
	Function Data	Predefined data for the function code request or response. For function 0x03, the request contains the starting address and number of registers. The response contains the byte count followed by register data.

Full details of Modbus TCP/IP messaging formats and protocols can be found in the *Modbus Messaging on TCP/IP Implementation Guide* available at www.modbus.org/specs.php.

3.5 Modbus Register Map

The AirSmartù G2 Modbus interface provides an extensive amount of data about the operation and configuration of the machine over the Modbus network. Registers are grouped by function and documented in the sections below. Note that Modbus registers are 16-bit values with big-endian byte ordering. Where required, multiple 16-bit registers may be combined to represent a single value as described in the tables below. Refer to the tables, notes, and examples for information on how to interpret the data presented over the Modbus interface.

3.5.1 Application-Specific Values

Note that the AirSmartù G2 controller is highly configurable and used across a wide range of machines. The software has support for various options that are specific to certain machines and applications, including different compressor models and blowers. The tables below document all available registers on the AirSmartù G2, many of which are only applicable to certain machines depending on the machine feature set and configuration. The *Application* column in the register map tables provides general information on what machine types use the associated register. However, always refer to the documentation for your specific machine, including the operating manual and wiring diagrams, to determine what features are available in the control system.

3.5.2 Register Number Notation

There are multiple conventions for Modbus register notation that are widely used. The tables included in this manual use the *Modicon* convention for numbering, as that is what is commonly used in Modbus master software packages. In this notation, register numbers are prefixed with a number identifying their type. The prefix for holding registers is `4_, so all register numbers in the tables below will be offset by a value of 40000, ranging from 40001 to 49999. For example, holding register number 1 will be represented as 40001. Modbus master software packages will either utilize addresses of 40001-49999 or 1-9999 with a selection for register type. Refer to the documentation for your software if you are unsure of what addressing notation is used.

Note that register numbers are numbered beginning at 1, while register addresses (as used in the Modbus frame) are numbered beginning at 0. Therefore, register 40001 is equivalent to holding register number 1, which would be transmitted to the Modbus device as register address 0 in the Modbus frame.

3.5.3 General Information

Registers in this section contain general information about the operation of the machine including operating state, status, advisories and faults, and machine hours.

Table 3.3: General Status Registers

Register	Parameter Description	Units	Data Type	Application
40001	Reserved	--	--	--
40002	Controller State	See Table 3.4	Unsigned Integer (16 bit)	Compressor / Blower
40003	Percent Load	Percent	Unsigned Integer (16 bit)	Compressor / Blower
40004	Current Fault Code	See Table 3.6	Unsigned Integer (16 bit)	Compressor / Blower
40005	Time of Last Fault [1]	Seconds (UNIX Timestamp)	Unsigned Integer (32 bit)	Compressor / Blower
40006				
40007	Current Advisory Code	See Table 3.5	Unsigned Integer (16 bit)	Compressor / Blower
40008	Time of Last Advisory [1]	Seconds (UNIX Timestamp)	Unsigned Integer (32 bit)	Compressor / Blower
40009				
40010	Total Running Hours [2]	Seconds	Unsigned Integer (32 bit)	Compressor / Blower
40011				
40012	Loaded Hours [2]	Seconds	Unsigned Integer (32 bit)	Compressor
40013				
40014	Oil Age [2]	Seconds	Unsigned Integer (32 bit)	Compressor / Blower
40015				
40016	Real-Time Clock (RTC) Time [1]	Seconds (UNIX Timestamp)	Unsigned Integer (32 bit)	Compressor / Blower
40017				
40018	Start Timer Time Remaining	Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40019	Stop Timer Time Remaining	Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40020	Blowdown Timer Time Remaining	Seconds	Unsigned Integer (16 bit)	Compressor
40021	Auto Timer Time Remaining	Seconds	Unsigned Integer (16 bit)	Compressor
40022	Idle Timer Time Remaining	Seconds	Unsigned Integer (16 bit)	Compressor

Notes:

[1] For values with `UNIX Timestamp_ units, a 16-bit value from each of two registers are combined to form a 32-bit UNIX Timestamp. For each pair of registers, the hexadecimal value of the first register is read as the first four (most significant) digits, and that of the second register is read as the last four (least significant) digits. This final value is the number of seconds since midnight on January 1, 1970, which can be converted to the date and time of the corresponding event.

[2] These values are determined by combining a 16-bit value from each of two registers to form a 32-bit value. For each pair of registers, the hexadecimal value of the first register is read as the first four (most significant) digits, and that of the second register is read as the last four (least significant) digits. This final value is the corresponding time in seconds.

Table 3.4: Controller States

Value	State
0	Reset
1	Auto Restart
2	Shutdown
3	Ready
4	Remote Halt
5	Ask to Start
6	Enabled
7	Ask to Load
8	Pre-Wye

Value	State
9	Wye
10	Delta
11	Start
12	Pause
13	Loaded
14	Unload
15	Blowdown
16	Normal Stop

Table 3.5: Advisory Codes

Value	Advisory Code
0	System OK
1	Air Filter Timer
2	Oil Filter Timer
3	Oil Sample Timer
4	Oil Change Timer
5	Separator Change Timer
6	Motor Lube Timer
7	Control Box Filter Timer
8	Advisory Alarm
9	User Alarm
10	Motor Over Temperature
11	Low Voltage Relay

Value	Advisory Code
12	Water Pressure
13	High Vibration
14	Air Filter Timer
15	Oil Filter Timer
16	Change Separator
17	Low Oil Pressure
18	Low Ambient A
19	High Plant Delivery Temperature
20	Low Ambient B
21	High Separator Temperature
22	High Discharge Temperature
23	High Interstage Temperature

Value	Advisory Code
24	High Inlet Temperature
25	High Discharge Pressure
26	High Inlet Pressure
27	Low Oil Level 1
28	Low Oil Level 2
29	High Enclosure Temperature
30	High Oil Temperature 1
31	High Oil Temperature 2
32	High Plant Delivery Pressure
33	High Control Box Temperature

Table 3.6: Fault Codes

Value	Fault Code
0	System OK
1	Hardware Fault
2	SD Card Error
3	Configuration Error
4	Power Failure
5	Emergency Stop
6	Open XD1
7	Shorted XD1
8	Open XD2
9	Shorted XD2
10	Open XD3
11	Shorted XD3
12	Open TT1
13	Shorted TT1
14	Open TT2
15	Shorted TT2
16	Open TT3
17	Shorted TT3
18	CAN Communication Error
19	Sequencing Communication Error
20	Actuator Communication Error
21	Drive 1 Communication Error
22	Drive 2 Communication Error
23	Drive 3 Communication Error
24	Drive 1 Fault

Value	Fault Code
25	Drive 2 Fault
26	Drive 3 Fault
27	Shutdown Fault
28	User Fault
29	VFD Fault
30	MBC Fault
31	Motor Fault
32	Motor Over temperature
33	Fan Fault
34	Phase Sequence
35	Low Voltage Relay
36	Safety Switch
37	Belt Break
38	Water Pressure
39	High Vibration
40	Plant Delivery Pressure
41	High Separator Pressure
42	High reservoir Pressure
43	High Interstage Pressure
44	Low Oil Pressure
45	Change Separator
46	Low Sump Pressure
47	High Plant Delivery Temperature
48	High Plant Temperature Rate
49	High Separator Temperature

Value	Fault Code
50	High Separator Temperature Rate
51	High Discharge Temperature
52	High Discharge Temperature Rate
53	High Interstage Temperature
54	High Interstage Temperature Rate
55	Motor Auxiliary
56	Cooler Auxiliary
57	Enclosure Temperature
58	High Discharge Pressure
59	High Inlet Pressure
60	Low Oil Level 1
61	Low Oil Level 2
62	High Oil Level 1
63	High Oil Level 2
64	Low Ambient Temperature
65	High Differential Temperature
66	High Differential Temperature Rate
67	High Enclosure Temperature
68	High Enclosure Temperature Rate
69	High Oil Temperature 1
70	High Oil Temperature 2
71	High Oil Temperature Rate
72	High Control Box Temperature

3.5.4 Scaled Input / Output

The following registers indicate the values of various analog inputs and outputs.

Table 3.7: Scaled I/O Registers

Address	Parameter Description	Units	Data Type	Application
40025	Reserved	--	--	--
40026	Ain Inlet Pressure	1/10 PSI	Unsigned Integer (16 bit)	Blower
40027	Ain Interstage Pressure	1/10 PSI	Unsigned Integer (16 bit)	2-Stage Compressor
40028	Reserved	--	--	--
40029	Ain Discharge Pressure	1/10 PSI	Unsigned Integer (16 bit)	Compressor / Blower
40030	Ain Reservoir Pressure	1/10 PSI	Unsigned Integer (16 bit)	Compressor
40031	Ain Separator Pressure	1/10 PSI	Unsigned Integer (16 bit)	Compressor
40032	Ain Differential Pressure	1/10 PSI	Unsigned Integer (16 bit)	Compressor / Blower
40033	Ain Plant Delivery Pressure	1/10 PSI	Unsigned Integer (16 bit)	Compressor
40034	Ain System Pressure	1/10 PSI	Unsigned Integer (16 bit)	Compressor / Blower
40035	Ain Oil Pressure	1/10 PSI	Unsigned Integer (16 bit)	Compressor
40036	Reserved	--	--	--
40037	Ain Inlet Temperature	1/10 °C	Unsigned Integer (16 bit)	Compressor / Blower
40038	Ain Interstage Temperature	1/10 °C	Unsigned Integer (16 bit)	2-Stage Compressor
40039	Reserved	--	--	--
40040	Ain Discharge Temperature	1/10 °C	Unsigned Integer (16 bit)	Compressor / Blower
40041	Ain Separator Temperature	1/10 °C	Unsigned Integer (16 bit)	Compressor
40042	Reserved	--	--	--
40043	Ain Plant Delivery Temperature	1/10 °C	Unsigned Integer (16 bit)	Compressor
40044	Reserved	--	--	--
40045	Ain Oil Temperature	1/10 °C	Unsigned Integer (16 bit)	Compressor
40046	Reserved	--	--	--
40047	Reserved	--	--	--
40048	Ain Enclosure Temperature	1/10 °C	Unsigned Integer (16 bit)	Blower
40049	Ain Oil Temperature 1	1/10 °C	Unsigned Integer (16 bit)	Blower

Address	Parameter Description	Units	Data Type	Application
40050	Ain Oil Temperature 2	1/10 °C	Unsigned Integer (16 bit)	Blower
40051	Ain Oil Level 1	1/10 Volts	Unsigned Integer (16 bit)	Blower
40052	Ain Oil Level 2	1/10 Volts	Unsigned Integer (16 bit)	Blower
40053	Ain Current Sensor	1/10 Amps	Unsigned Integer (16 bit)	Compressor
40054	Reserved	--	--	--
40055	Ain Remote Speed Control	1/10 Percent	Unsigned Integer (16 bit)	Blower
40056	Reserved	--	--	--
40057	Reserved	--	--	--
40058	Reserved	--	--	--
40059	Ain User Input 1	User-defined	Unsigned Integer (16 bit)	Compressor / Blower
40060	Ain User Input 2	User-defined	Unsigned Integer (16 bit)	Compressor / Blower
40061	Reserved	--	--	--
40062	Reserved	--	--	--
40063	Reserved	--	--	--
40064	Reserved	--	--	--
40065	Reserved	--	--	--
40066	Reserved	--	--	--
40067	Reserved	--	--	--

3.5.5 Maintenance

The parameters in this section contain information regarding the maintenance of the machine, including maintenance interval settings and time remaining until service is required.

Table 3.8: Maintenance Registers

Address	Parameter Description	Units	Data Type	Application
40075	Air filter Change Interval	Hours	Unsigned Integer (16 bit)	Compressor / Blower
40076	Oil Filter Change Interval	Hours	Unsigned Integer (16 bit)	Compressor / Blower
40077	Oil Sample Change Interval	Hours	Unsigned Integer (16 bit)	Compressor
40078	Oil Change Interval	Hours	Unsigned Integer (16 bit)	Compressor
40079	Oil Separator Change Interval	Hours	Unsigned Integer (16 bit)	Compressor
40080	Motor Lubrication Change Interval	Hours	Unsigned Integer (16 bit)	Compressor / Blower
40081	Control Box Air Filter Change Interval	Hours	Unsigned Integer (16 bit)	Compressor / Blower
40082	Reserved	--	--	--
40083	Reserved	--	--	--
40084	Reserved	--	--	--
40085	Air Filter Change Time Remaining	Hours	Unsigned Integer (16 bit)	Compressor / Blower
40086	Oil Filter Change Time Remaining	Hours	Unsigned Integer (16 bit)	Compressor / Blower
40087	Oil Sample Change Time Remaining	Hours	Unsigned Integer (16 bit)	Compressor
40088	Oil Change Time Remaining	Hours	Unsigned Integer (16 bit)	Compressor
40089	Oil Separator Change Time Remaining	Hours	Unsigned Integer (16 bit)	Compressor
40090	Motor Lubrication Change Time Remaining	Hours	Unsigned Integer (16 bit)	Compressor / Blower
40091	Control Box Air Filter Change Time Remaining	Hours	Unsigned Integer (16 bit)	Compressor / Blower
40092	Reserved	--	--	--
40093	Reserved	--	--	--
40094	Reserved	--	--	--

3.5.6 Drivetrain / Modulation

This section contains parameters related to the machine drivetrain and modulation settings and performance. In Table 3.9, V1 refers to the main motor and VFD on single-stage machines, or to the first-stage motor and VFD on two-stage machines. V2 refers to the second-stage motor and VFD on two-stage machines. V3 refers to the cooling fan motor and VFD for machines that have a variable speed cooling fan.

Table 3.9: Drivetrain / Modulation Registers

Address	Parameter Description	Units	Data Type	Application
40100	PID 1 Proportional Gain	Percent	Unsigned Integer (16 bit)	Compressor / Blower
40101	PID 1 Integration Time	1/100 Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40102	PID 1 Differential Rate	1/100 Rate of Change	Unsigned Integer (16 bit)	Compressor / Blower
40103	PID 1 Dead Band	1/10 Error Units	Unsigned Integer (16 bit)	Compressor / Blower
40104	PID 1 Output	Percent	Unsigned Integer (16 bit)	Compressor / Blower
40105	PID 2 Proportional Gain	Percent	Unsigned Integer (16 bit)	Compressor / Blower
40106	PID 2 Integration Time	1/100 Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40107	PID 2 Differential Rate	1/100 Rate of Change	Unsigned Integer (16 bit)	Compressor / Blower
40108	PID 2 Dead Band	1/10 Error Units	Unsigned Integer (16 bit)	Compressor / Blower
40109	PID 2 Output	Percent	Unsigned Integer (16 bit)	Compressor / Blower
40110	PID 3 Proportional Gain	Percent	Unsigned Integer (16 bit)	Compressor / Blower
40111	PID 3 Integration Time	1/100 Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40112	PID 3 Differential Rate	1/100 Rate of Change	Unsigned Integer (16 bit)	Compressor / Blower
40113	PID 3 Dead Band	1/10 Error Units	Unsigned Integer (16 bit)	Compressor / Blower
40114	PID 3 Output	Percent	Unsigned Integer (16 bit)	Compressor / Blower
40115	V1 Type	0 = None 1 = PF400 2 = PF70 3 = PF700	Unsigned Integer (16 bit)	Compressor / Blower
40116	V1 Status Register	Drive-Specific Code	Unsigned Integer (16 bit)	Compressor / Blower
40117	V1 Fault Code	Drive-Specific Code	Unsigned Integer (16 bit)	Compressor / Blower
40118	V1 Command Register	Drive-Specific Code	Unsigned Integer (16 bit)	Compressor / Blower
40119	V1 Commanded Frequency	1/100 Hz	Unsigned Integer (16 bit)	Compressor / Blower
40120	V1 Actual Frequency	1/100 Hz	Unsigned Integer (16 bit)	Compressor / Blower
40121	V1 Motor RPM	RPM	Unsigned Integer (16 bit)	Compressor / Blower
40122	V1 Line Voltage (specific to drive type, if available)	1/10 Volts	Unsigned Integer (16 bit)	Compressor / Blower
40123	V1 DC Bus Voltage	1/10 Volts	Unsigned Integer (16 bit)	Compressor / Blower

Address	Parameter Description	Units	Data Type	Application
40124	V1 Motor Voltage	1/10 Volts	Unsigned Integer (16 bit)	Compressor / Blower
40125	V1 Motor Current	1/10 Amps	Unsigned Integer (16 bit)	Compressor / Blower
40126	V1 Motor Power	1/10 kW	Unsigned Integer (16 bit)	Compressor / Blower
40127	V1 Heat Sink Temperature	1/10 °C	Unsigned Integer (16 bit)	Compressor / Blower
40128	V1 Firmware Version	Drive-Specific Code	Unsigned Integer (16 bit)	Compressor / Blower
40129	V1 Motor Nameplate Volts	1/10 Volts	Unsigned Integer (16 bit)	Compressor / Blower
40130	V1 Motor Nameplate Hz	1/100 Hz	Unsigned Integer (16 bit)	Compressor / Blower
40131	V1 Motor Nameplate Amps	1/10 Amps	Unsigned Integer (16 bit)	Compressor / Blower
40132	V1 Digital Inputs	Drive-Specific, Bit-map	Unsigned Integer (16 bit)	Compressor / Blower
40133	V1 Digital Outputs	Drive-Specific, Bit-map	Unsigned Integer (16 bit)	Compressor / Blower
40134	V1 Analog Input Channel 1	Drive-Specific, Raw Value	Unsigned Integer (16 bit)	Compressor / Blower
40135	V1 Analog Input Channel 2	Drive-Specific, Raw Value	Unsigned Integer (16 bit)	Compressor / Blower
40136	V1 Analog Input Channel 3	Drive-Specific, Raw Value	Unsigned Integer (16 bit)	Compressor / Blower
40137	V1 Analog Input Channel 4	Drive-Specific, Raw Value	Unsigned Integer (16 bit)	Compressor / Blower
40138	V1 Analog Output Channel 1	Drive-Specific, Raw Value	Unsigned Integer (16 bit)	Compressor / Blower
40139	V1 Analog Output Channel 2	Drive-Specific, Raw Value	Unsigned Integer (16 bit)	Compressor / Blower
40140	V1 Manual Frequency	1/100 Hz	Unsigned Integer (16 bit)	Compressor / Blower
40141	V1 Spare Register	--	--	--
40142	V2 Type	0 = None 1 = PF400 2 = PF70 3 = PF700	Unsigned Integer (16 bit)	Compressor
40143	V2 Status Register	Drive-Specific Code	Unsigned Integer (16 bit)	Compressor
40144	V2 Fault Code	Drive-Specific Code	Unsigned Integer (16 bit)	Compressor
40145	V2 Command Register	Drive-Specific Code	Unsigned Integer (16 bit)	Compressor
40146	V2 Commanded Frequency	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40147	V2 Actual Frequency	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40148	V2 Motor RPM	RPM	Unsigned Integer (16 bit)	Compressor
40149	V2 Line Voltage (specific to drive type, if available)	1/10 Volts	Unsigned Integer (16 bit)	Compressor
40150	V2 DC Bus Voltage	1/10 Volts	Unsigned Integer (16 bit)	Compressor

Address	Parameter Description	Units	Data Type	Application
40151	V2 Motor Voltage	1/10 Volts	Unsigned Integer (16 bit)	Compressor
40152	V2 Motor Current	1/10 Amps	Unsigned Integer (16 bit)	Compressor
40153	V2 Motor Power	1/10 kW	Unsigned Integer (16 bit)	Compressor
40154	V2 Heat Sink Temperature	1/10 °C	Unsigned Integer (16 bit)	Compressor
40155	V2 Firmware Version	Drive-Specific Code	Unsigned Integer (16 bit)	Compressor
40156	V2 Motor Nameplate Volts	1/10 Volts	Unsigned Integer (16 bit)	Compressor
40157	V2 Motor Nameplate Hz	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40158	V2 Motor Nameplate Amps	1/10 Amps	Unsigned Integer (16 bit)	Compressor
40159	V2 Digital Inputs	Drive-Specific, Bit-map	Unsigned Integer (16 bit)	Compressor
40160	V2 Digital Outputs	Drive-Specific, Bit-map	Unsigned Integer (16 bit)	Compressor
40161	V2 Analog Input Channel 1	Drive-Specific, Raw Value	Unsigned Integer (16 bit)	Compressor
40162	V2 Analog Input Channel 2	Drive-Specific, Raw Value	Unsigned Integer (16 bit)	Compressor
40163	V2 Analog Input Channel 3	Drive-Specific, Raw Value	Unsigned Integer (16 bit)	Compressor
40164	V2 Analog Input Channel 4	Drive-Specific, Raw Value	Unsigned Integer (16 bit)	Compressor
40165	V2 Analog Output Channel 1	Drive-Specific, Raw Value	Unsigned Integer (16 bit)	Compressor
40166	V2 Analog Output Channel 2	Drive-Specific, Raw Value	Unsigned Integer (16 bit)	Compressor
40167	V2 Manual Frequency	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40168	V2 Spare Register	--	--	--
40169	V3 Type	0 = None 1 = PF400 2 = PF70 3 = PF700	Unsigned Integer (16 bit)	Compressor
40170	V3 Status Register	Drive-Specific Code	Unsigned Integer (16 bit)	Compressor
40171	V3 Fault Code	Drive-Specific Code	Unsigned Integer (16 bit)	Compressor
40172	V3 Command Register	Drive-Specific Code	Unsigned Integer (16 bit)	Compressor
40173	V3 Commanded Frequency	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40174	V3 Actual Frequency	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40175	V3 Motor RPM	RPM	Unsigned Integer (16 bit)	Compressor
40176	V3 Line Voltage (specific to drive type, if available)	1/10 Volts	Unsigned Integer (16 bit)	Compressor
40177	V3 DC Bus Voltage	1/10 Volts	Unsigned Integer (16 bit)	Compressor
40178	V3 Motor Voltage	1/10 Volts	Unsigned Integer (16 bit)	Compressor

Address	Parameter Description	Units	Data Type	Application
40179	V3 Motor Current	1/10 Amps	Unsigned Integer (16 bit)	Compressor
40180	V3 Motor Power	1/10 kW	Unsigned Integer (16 bit)	Compressor
40181	V3 Heat Sink Temperature	1/10 °C	Unsigned Integer (16 bit)	Compressor
40182	V3 Firmware Version	Drive-Specific Code	Unsigned Integer (16 bit)	Compressor
40183	V3 Motor Nameplate Volts	1/10 Volts	Unsigned Integer (16 bit)	Compressor
40184	V3 Motor Nameplate Hz	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40185	V3 Motor Nameplate Amps	1/10 Amps	Unsigned Integer (16 bit)	Compressor
40186	V3 Digital Inputs	Drive-Specific, Bit-map	Unsigned Integer (16 bit)	Compressor
40187	V3 Digital Outputs	Drive-Specific, Bit-map	Unsigned Integer (16 bit)	Compressor
40188	V3 Analog Input Channel 1	Drive-Specific, Raw Value	Unsigned Integer (16 bit)	Compressor
40189	V3 Analog Input Channel 2	Drive-Specific, Raw Value	Unsigned Integer (16 bit)	Compressor
40190	V3 Analog Input Channel 3	Drive-Specific, Raw Value	Unsigned Integer (16 bit)	Compressor
40191	V3 Analog Input Channel 4	Drive-Specific, Raw Value	Unsigned Integer (16 bit)	Compressor
40192	V3 Analog Output Channel 1	Drive-Specific, Raw Value	Unsigned Integer (16 bit)	Compressor
40193	V3 Analog Output Channel 2	Drive-Specific, Raw Value	Unsigned Integer (16 bit)	Compressor
40194	V3 Manual Frequency	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40195	V3 Spare	--	--	--
40196	V1 Minimum Frequency at P1 Pressure	1/100 Hz	Unsigned Integer (16 bit)	Compressor / Blower
40197	V1 Maximum Frequency at P1 Pressure	1/100 Hz	Unsigned Integer (16 bit)	Compressor / Blower
40198	V1 Minimum Frequency at P2 Pressure	1/100 Hz	Unsigned Integer (16 bit)	Compressor / Blower
40199	V1 Maximum Frequency at P2 Pressure	1/100 Hz	Unsigned Integer (16 bit)	Compressor / Blower
40200	V1 Minimum Frequency at P3 Pressure	1/100 Hz	Unsigned Integer (16 bit)	Compressor / Blower
40201	V1 Maximum Frequency at P3 Pressure	1/100 Hz	Unsigned Integer (16 bit)	Compressor / Blower
40202	V1 Minimum Frequency at P4 Pressure	1/100 Hz	Unsigned Integer (16 bit)	Compressor / Blower
40203	V1 Maximum Frequency at P4 Pressure	1/100 Hz	Unsigned Integer (16 bit)	Compressor / Blower
40204	V1 Minimum Frequency at P5 Pressure	1/100 Hz	Unsigned Integer (16 bit)	Compressor / Blower
40205	V1 Maximum Frequency at P5 Pressure	1/100 Hz	Unsigned Integer (16 bit)	Compressor / Blower
40206	V2 Minimum Frequency at P1 Pressure	1/100 Hz	Unsigned Integer (16 bit)	Compressor

Address	Parameter Description	Units	Data Type	Application
40207	V2 Maximum Frequency at P1 Pressure	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40208	V2 Minimum Frequency at P2 Pressure	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40209	V2 Maximum Frequency at P2 Pressure	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40210	V2 Minimum Frequency at P3 Pressure	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40211	V2 Maximum Frequency at P3 Pressure	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40212	V2 Minimum Frequency at P4 Pressure	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40213	V2 Maximum Frequency at P4 Pressure	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40214	V2 Minimum Frequency at P5 Pressure	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40215	V2 Maximum Frequency at P5 Pressure	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40216	P1 Pressure Setting	1/10 PSI	Unsigned Integer (16 bit)	Compressor / Blower
40217	P2 Pressure Setting	1/10 PSI	Unsigned Integer (16 bit)	Compressor / Blower
40218	P3 Pressure Setting	1/10 PSI	Unsigned Integer (16 bit)	Compressor / Blower
40219	P4 Pressure Setting	1/10 PSI	Unsigned Integer (16 bit)	Compressor / Blower
40220	P5 Pressure Setting	1/10 PSI	Unsigned Integer (16 bit)	Compressor / Blower
40221	Maximum Capacity Limit	Percent	Unsigned Integer (16 bit)	Compressor / Blower
40222	Cold Start Capacity Limit	Percent	Unsigned Integer (16 bit)	Compressor / Blower
40223	Cold Start Timer Duration	1/10 Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40224	System Voltage	Volts	Unsigned Integer (16 bit)	Compressor / Blower
40225	Minimum Voltage Factor	Volts	Unsigned Integer (16 bit)	Compressor / Blower
40226	User-set Elevation	Feet	Unsigned Integer (16 bit)	Compressor / Blower
40227	V1 Nominal Current	1/10 Amps	Unsigned Integer (16 bit)	Compressor / Blower
40228	V1 Maximum Current	1/10 Amps	Unsigned Integer (16 bit)	Compressor / Blower
40229	V2 Nominal Current	1/10 Amps	Unsigned Integer (16 bit)	Compressor
40230	V2 Maximum Current	1/10 Amps	Unsigned Integer (16 bit)	Compressor
40231	V3 Nominal Current	1/10 Amps	Unsigned Integer (16 bit)	Compressor
40232	V3 Maximum Current	1/10 Amps	Unsigned Integer (16 bit)	Compressor
40233	V1 Heat Sink Temperature Limit	1/10 °C	Unsigned Integer (16 bit)	Compressor / Blower
40234	V2 Heat Sink Temperature Limit	1/10 °C	Unsigned Integer (16 bit)	Compressor / Blower

Address	Parameter Description	Units	Data Type	Application
40235	V3 Heat Sink Temperature Limit	1/10 °C	Unsigned Integer (16 bit)	Compressor / Blower
40236	Inlet Temperature Limit	1/10 °C	Unsigned Integer (16 bit)	Compressor / Blower
40237	Calculated V1 Minimum Speed	1/100 Hz	Unsigned Integer (16 bit)	Compressor / Blower
40238	Calculated V1 Maximum Speed	1/100 Hz	Unsigned Integer (16 bit)	Compressor / Blower
40239	Calculated V2 Minimum Speed	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40240	Calculated V2 Maximum Speed	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40241	Minimum Speed Factor	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40242	Maximum Speed Factor	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40243	Motor Starter Type	0 = VFD 1 = Full Voltage 2 = Wye-Delta	Unsigned Integer (16 bit)	Compressor / Blower
40244	Motor Acceleration Time	1/10 seconds	Unsigned Integer (16 bit)	Compressor / Blower
40245	Star/Wye Mode Time	1/10 seconds	Unsigned Integer (16 bit)	Compressor / Blower
40246	Star/Wye To Delta Time	1/10 seconds	Unsigned Integer (16 bit)	Compressor / Blower
40247	Motor Service Factor Amps (for packages with turn-valve modulation)	1/10 Amps	Unsigned Integer (16 bit)	Compressor
40248	V1 Lag Start Interstage Pressure	1/10 PSI	Unsigned Integer (16 bit)	Compressor
40249	V1 Lag Start Delay Time	1/10 Seconds	Unsigned Integer (16 bit)	Compressor
40250	Aftercooler Pressure Offset	1/10 PSI	Unsigned Integer (16 bit)	Compressor
40251	Inlet Valve Target Offset	1/10 PSI	Unsigned Integer (16 bit)	Compressor

3.5.7 Machine Information and Configuration

The registers in this section provide basic information about the machine and configuration including operating mode, units, setpoints, and current display variables.

Table 3.10: Machine Information Registers

Address	Parameter Description	Units	Data Type	Application
40300	Machine Type	0 = Fixed Speed 1 = Variable Speed	Unsigned Integer (16 bit)	Compressor / Blower
40301	Unit Operating Mode	0 = Constant 1 = Low Demand 2 = Automatic 3 = Sequenced 4 = Connect 12 5 = Manual 6 = Remote	Unsigned Integer (16 bit)	Compressor / Blower
40302	Unit Control Mode	0 = Local 1 = Remote	Unsigned Integer (16 bit)	Compressor / Blower
40303	Blower Air Direction	0 = Pressure 1 = Vacuum	Unsigned Integer (16 bit)	Blower
40304	Language Selection	See Table 3.11	Unsigned Integer (16 bit)	Compressor / Blower
40305	Pressure Units	0 = PSI 1 = BAR 2 = kilopascals 3 = kilopounds per cm^2 4 = in. Hg 5 = mm Hg 6 = in. H20 7 = mm H20	Unsigned Integer (16 bit)	Compressor / Blower
40306	Temperature Units	0 = Fahrenheit 1 = Celsius	Unsigned Integer (16 bit)	Compressor / Blower
40307	Status Display Information	None	Unsigned Integer (16 bit)	Compressor / Blower
40308	Current Timer Display Value	Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40309	Local Control Target Pressure	1/10 PSI	Unsigned Integer (16 bit)	Compressor / Blower
40310	Local Control Unload Pressure	1/10 PSI	Unsigned Integer (16 bit)	Compressor
40311	Local Control Load Pressure	1/10 PSI	Unsigned Integer (16 bit)	Compressor
40312	Remote Control Target Pressure	1/10 PSI	Unsigned Integer (16 bit)	Compressor / Blower
40313	Remote Control Unload Pressure	1/10 PSI	Unsigned Integer (16 bit)	Compressor
40314	Remote Control Load Pressure	1/10 PSI	Unsigned Integer (16 bit)	Compressor
40315	Secondary Pressure Offset	1/10 PSI	Unsigned Integer (16 bit)	Compressor
40316	Minimum Target Pressure Limit	1/10 PSI	Unsigned Integer (16 bit)	Compressor
40317	Control Pressure	1/10 PSI	Unsigned Integer (16 bit)	Compressor / Blower
40318	Restart Pressure	1/10 PSI	Unsigned Integer (16 bit)	Compressor

Address	Parameter Description	Units	Data Type	Application
40319	Blowdown Timer Duration	1/10 Seconds	Unsigned Integer (16 bit)	Compressor
40320	Blowdown Counter	None - Counter	Unsigned Integer (16 bit)	Compressor
40321	Auto Timer Duration	1/10 Seconds	Unsigned Integer (16 bit)	Compressor
40322	Start Delay Timer Duration	1/10 Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40323	Stop Delay Timer Duration	1/10 Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40324	Auto Restart Enable	0 = Disabled 1 = Enabled	Unsigned Integer (16 bit)	Compressor / Blower
40325	Auto Restart Timer Duration	1/10 Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40326	Idle Timer Duration	1/10 Seconds	Unsigned Integer (16 bit)	Compressor
40327	Delayed Break Timer Duration	1/10 Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40328	Remote Halt Mode	0 = Immediate Halt 1 = Timed Unload	Unsigned Integer (16 bit)	Compressor / Blower
40329	Real-Time Clock Enable	0 = Disabled 1 = Enabled	Unsigned Integer (16 bit)	Compressor / Blower
40330	Real-Time Clock Mode	0 = Start / Stop 1 = Secondary Pressure	Unsigned Integer (16 bit)	Compressor / Blower
40331	Drain Solenoid Open Interval	1/10 Seconds	Unsigned Integer (16 bit)	Compressor
40332	Drain Solenoid Close Interval	1/10 Seconds	Unsigned Integer (16 bit)	Compressor
40333	Belt Drive Ratio	1/100 Ratio	Unsigned Integer (16 bit)	Blower
40334	Status Display State	0 = Good 1 = Advisory 2 = Shutdown 3 = Fault	Unsigned Integer (16 bit)	Compressor / Blower
40335	Inlet Modulation Mode	0 = Load / Unload 1 = Modulate	Unsigned Integer (16 bit)	Compressor

Table 3.11: Language Codes

Value	Language
0	US English
1	UK English
2	Español
3	Français
4	Português
5	Deutsch
6	Italiano
7	Pycc
8	Nederlands
9	

Value	Language
10	Ceptina
11	Dansk
12	Eesti
13	Suomi
14	
15	Magyar
16	Lietuvi
17	Norsk
18	Polski
19	Svenska

3.5.8 Operating Limits

The following registers identify the limits of all shutdown faults and advisory alarms.

Table 3.12: Operating Limits Registers

Address	Parameter Description	Units	Data Type	Application
40350	Reserved	--	--	--
40351	Reserved	--	--	--
40352	Reserved	--	--	--
40353	Reserved	--	--	--
40354	High Interstage Pressure Alarm Limit	1/10 PSI	Unsigned Integer (16 bit)	2-Stage Compressor
40355	High Interstage Pressure Fault Limit	1/10 PSI	Unsigned Integer (16 bit)	2-Stage Compressor
40356	High Pressure Alarm Limit	1/10 PSI	Unsigned Integer (16 bit)	Compressor / Blower
40357	High Pressure Fault Limit	1/10 PSI	Unsigned Integer (16 bit)	Compressor / Blower
40358	High Differential Pressure Alarm Limit	1/10 PSI	Unsigned Integer (16 bit)	Compressor / Blower
40359	High Differential Pressure Fault Limit	1/10 PSI	Unsigned Integer (16 bit)	Compressor / Blower
40360	High Oil Pressure Alarm Limit	1/10 PSI	Unsigned Integer (16 bit)	Compressor
40361	High Oil Pressure Fault Limit	1/10 PSI	Unsigned Integer (16 bit)	Compressor
40362	Reserved	--	--	--
40363	Reserved	--	--	--
40364	Reserved	--	--	--
40365	Reserved	--	--	--
40366	Reserved	--	--	--
40367	Low Ambient Temperature Alarm Limit	1/10 °C	Unsigned Integer (16 bit)	Compressor / Blower
40368	Low Ambient Temperature Fault Limit	1/10 °C	Unsigned Integer (16 bit)	Compressor / Blower
40369	High Ambient Temperature Alarm Limit	1/10 °C	Unsigned Integer (16 bit)	Compressor / Blower
40370	High Ambient Temperature Fault Limit	1/10 °C	Unsigned Integer (16 bit)	Compressor / Blower
40371	High Interstage Temperature Alarm Limit	1/10 °C	Unsigned Integer (16 bit)	2-Stage Compressor
40372	High Interstage Temperature Fault Limit	1/10 °C	Unsigned Integer (16 bit)	2-Stage Compressor
40373	High Stage 2 Inlet Temperature Alarm Limit	1/10 °C	Unsigned Integer (16 bit)	2-Stage Compressor
40374	High Stage 2 Inlet Temperature Fault High Limit	1/10 °C	Unsigned Integer (16 bit)	2-Stage Compressor
40375	High Temperature Alarm Limit	1/10 °C	Unsigned Integer (16 bit)	Compressor / Blower
40376	High Temperature Fault Limit	1/10 °C	Unsigned Integer (16 bit)	Compressor / Blower

Address	Parameter Description	Units	Data Type	Application
40377	High Differential Temperature Alarm Limit	1/10 °C	Unsigned Integer (16 bit)	Compressor
40378	High Differential Temperature Fault Limit	1/10 °C	Unsigned Integer (16 bit)	Compressor
40379	High Plant Delivery Temperature Alarm Limit	1/10 °C	Unsigned Integer (16 bit)	Compressor
40380	High Plant Delivery Temperature Fault Limit	1/10 °C	Unsigned Integer (16 bit)	Compressor
40381	Reserved	--	--	--
40382	Reserved	--	--	--
40383	High Oil Temperature Alarm Limit	1/10 °C	Unsigned Integer (16 bit)	Compressor / Blower
40384	High Oil Temperature Fault Limit	1/10 °C	Unsigned Integer (16 bit)	Compressor / Blower
40385	Reserved	--	--	--
40386	Reserved	--	--	--
40387	High Enclosure Temperature Alarm Limit	1/10 °C	Unsigned Integer (16 bit)	Blower
40388	High Enclosure Temperature Fault Limit	1/10 °C	Unsigned Integer (16 bit)	Blower
40389	Temperature Rate Fault Enable	0 = Disabled 1 = Enabled	Unsigned Integer (16 bit)	Compressor
40390	Low Oil Level 1 Alarm Limit	1/10 Volts	Unsigned Integer (16 bit)	Blower
40391	Low Oil Level 1 Fault Limit	1/10 Volts	Unsigned Integer (16 bit)	Blower
40392	High Oil Level 1 Fault Limit	1/10 Volts	Unsigned Integer (16 bit)	Blower
40393	Low Oil Level 2 Alarm Limit	1/10 Volts	Unsigned Integer (16 bit)	Blower
40394	Low Oil Level 2 Fault Limit	1/10 Volts	Unsigned Integer (16 bit)	Blower
40395	High Oil Level 2 Fault Limit	1/10 Volts	Unsigned Integer (16 bit)	Blower
40396	Low User Input 1 Alarm Limit	Defined by User	Defined by User	Compressor / Blower
40397	Low User Input 1 Fault Limit	Defined by User	Defined by User	Compressor / Blower
40398	High User Input 1 Alarm Limit	Defined by User	Defined by User	Compressor / Blower
40399	High User Input 1 Fault Limit	Defined by User	Defined by User	Compressor / Blower
40400	Low User Input 2 Alarm Limit	Defined by User	Defined by User	Compressor / Blower
40401	Low User Input 2 Fault Limit	Defined by User	Defined by User	Compressor / Blower
40402	High User Input 2 Alarm Limit	Defined by User	Defined by User	Compressor / Blower
40403	High User Input 2 Fault Limit	Defined by User	Defined by User	Compressor / Blower

3.5.9 Cooling Information

The registers detailed in this section provide information about the configuration of the cooling system including fan configuration, temperature control, and oil configuration.

Table 3.13: Cooling Information Registers

Address	Parameter Description	Units	Data Type	Application
40425	Cooler Fan Type	0 = No Fan Type 1 = Single Speed 2 = Water Cooled 3 = Variable Speed PID 4 = Variable Speed V1 Power	Unsigned Integer (16 bit)	Compressor
40426	Minimum Target Temperature	1/10 °C	Unsigned Integer (16 bit)	Compressor
40427	Calculated Target Temperature	1/10 °C	Unsigned Integer (16 bit)	Compressor
40428	Target Temperature Adjustment	1/10 °C	Unsigned Integer (16 bit)	Compressor
40429	Cooler Fan Minimum V1 Power	1/10 kW	Unsigned Integer (16 bit)	Compressor
40430	Cooler Fan Maximum V1 Power	1/10 kW	Unsigned Integer (16 bit)	Compressor
40431	Cooler Fan Minimum Frequency	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40432	Cooler Fan Maximum Frequency	1/100 Hz	Unsigned Integer (16 bit)	Compressor
40433	Cooler Fan Minimum Voltage	1/10 Volts	Unsigned Integer (16 bit)	Compressor
40434	Cooler Fan Maximum Voltage	1/10 Volts	Unsigned Integer (16 bit)	Compressor
40435	Target Aftercooler Temperature Rise	1/10 °C	Unsigned Integer (16 bit)	Compressor
40436	Oil Type	0 = Standard 1 = High Temperature	Unsigned Integer (16 bit)	Compressor
40437	Oil Control Mode	0 = No Oil Control Mode 1 = Solenoid 2 = Delta T	Unsigned Integer (16 bit)	Compressor
40438	Oil Control Parameter A	See Table 3.14	Unsigned Integer (16 bit)	Compressor
40439	Oil Control Parameter B	See Table 3.14	Unsigned Integer (16 bit)	Compressor
40440	Oil Control Parameter C	See Table 3.14	Unsigned Integer (16 bit)	Compressor
40441	Oil Control Parameter D	See Table 3.14	Unsigned Integer (16 bit)	Compressor
40442	Oil Control Parameter E	See Table 3.14	Unsigned Integer (16 bit)	Compressor
40443	Oil Control Parameter F	See Table 3.14	Unsigned Integer (16 bit)	Compressor
40444	Oil Control Parameter G	See Table 3.14	Unsigned Integer (16 bit)	Compressor
40445	Oil Control Parameter H	See Table 3.14	Unsigned Integer (16 bit)	Compressor

The indications of Oil Control Parameters A-H are dependent upon the oil control mode being used. Table 3.14 describes the role of each parameter for each oil control mode.

Table 3.14: Oil Control Parameters

Parameter	Solenoid Mode Description	Units
A	Oil Control Valve C Low Temperature Value	1/10 °C
B	Stage 1 High Oil Temperature Value	1/10 °C
C	Stage 2 Low Oil Temperature Value	1/10 °C
D	Stage 2 High Oil Temperature Value	1/10 °C
E	Full Flow Start Time	1/10 Seconds
F	State Machine Step Period	1/10 Seconds
G	Not Used	N/A
H	Not Used	N/A

Parameter	Delta T Mode Description	Units
A	Maximum Valve Command	Percent
B	Minimum Valve Command	Percent
C	Valve PID Proportional Gain	Percent
D	Valve PID Integration Time	1/100 Seconds
E	Valve PID Differentiation Rate	1/100 Rate
F	Valve PID Dead Band	1/10 Error Units
G	Valve B Pressure	1/10 PSI
H	Not Used	None

3.5.10 Automatic Run Timers

The following table identifies the set values of all automatic run timers. The value of each start or stop register is the time in seconds from midnight, and indicates the time at which the compressor is set to automatically start or stop in automatic run mode. For example, if a unit was programmed to automatically start at 7:00 AM, this would equate to 25,200 seconds from midnight.

Table 3.15: AutoRun Timer Registers

Address	Parameter Description	Units	Data Type	Application
40475	Start Time Register 0	Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40476	Start Time Register 1	Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40477	Start Time Register 2	Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40478	Start Time Register 3	Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40479	Start Time Register 4	Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40480	Start Time Register 5	Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40481	Start Time Register 6	Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40482	Reserved	--	--	--
40483	Reserved	--	--	--
40484	Reserved	--	--	--
40485	Stop Time Register 0	Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40486	Stop Time Register 1	Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40487	Stop Time Register 2	Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40488	Stop Time Register 3	Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40489	Stop Time Register 4	Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40490	Stop Time Register 5	Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40491	Stop Time Register 6	Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40492	Reserved	--	--	--
40493	Reserved	--	--	--
40494	Reserved	--	--	--
40495	Timer Register 0 Type	0 = Undefined 2 = Daily 3 = Weekday 4 = Weekend	Unsigned Integer (16 bit)	Compressor / Blower
40496	Timer Register 1 Type	0 = Undefined 2 = Daily 3 = Weekday 4 = Weekend	Unsigned Integer (16 bit)	Compressor / Blower
40497	Timer Register 2 Type	0 = Undefined 2 = Daily 3 = Weekday 4 = Weekend	Unsigned Integer (16 bit)	Compressor / Blower

Address	Parameter Description	Units	Data Type	Application
40498	Timer Register 3 Type	0 = Undefined 2 = Daily 3 = Weekday 4 = Weekend	Unsigned Integer (16 bit)	Compressor / Blower
40499	Timer Register 4 Type	0 = Undefined 2 = Daily 3 = Weekday 4 = Weekend	Unsigned Integer (16 bit)	Compressor / Blower
40500	Timer Register 5 Type	0 = Undefined 2 = Daily 3 = Weekday 4 = Weekend	Unsigned Integer (16 bit)	Compressor / Blower
40501	Timer Register 6 Type	0 = Undefined 2 = Daily 3 = Weekday 4 = Weekend	Unsigned Integer (16 bit)	Compressor / Blower
40502	Reserved	--	--	--
40503	Reserved	--	--	--
40504	Reserved	--	--	--

3.5.11 Sequencing Configuration

The registers in this section provide information on peer-to-peer sequencing configuration.

Table 3.16: Sequencing Configuration Registers

Address	Parameter Description	Units	Data Type	Application
40525	Number Of Sequencing Units	Units	Unsigned Integer (16 bit)	Compressor / Blower
40526	Sequencing Unit Number	Unit Number	Unsigned Integer (16 bit)	Compressor / Blower
40527	Sequencing Transfer Interval	Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40528	Sequencing Hour Offset	Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40529	Sequencing Lag Start Delay	1/10 Seconds	Unsigned Integer (16 bit)	Compressor / Blower
40530	Transient Load Increment	Percent	Unsigned Integer (16 bit)	Compressor / Blower
40531	Transient Load Decrement	Percent	Unsigned Integer (16 bit)	Compressor / Blower
40532	Master Release Enable	0 = Disabled 1 = Enabled	Unsigned Integer (16 bit)	Blower
40533	Release Pressure	1/10 PSI	Unsigned Integer (16 bit)	Blower
40534	Machine Capacity	Cubic Feet / Minute (CFM)	Unsigned Integer (16 bit)	Compressor / Blower
40535	Total Capacity	Cubic Feet / Minute (CFM)	Unsigned Integer (16 bit)	Compressor / Blower

3.5.12 Digital/Analog IO Map

The following registers indicates the input or output address for each digital and analog input and output. For more information regarding IO mapping, refer to *the AirSmart™ Controller 2nd Generation User's Manual*, Gardner Denver document 13-17-613.

Table 3.17: I/O Map Registers

Address	Parameter Description	Units	Data Type	Application
40600	Digital Input Reset Alarm	Address	Signed Integer (16 bit)	Compressor / Blower
40601	Digital Input Remote Halt	Address	Signed Integer (16 bit)	Compressor / Blower
40602	Digital Input Remote Halt Enable	Address	Signed Integer (16 bit)	Compressor
40603	Digital Input Remote Load	Address	Signed Integer (16 bit)	Compressor
40604	Digital Input Remote Load Enable	Address	Signed Integer (16 bit)	Compressor
40605	Digital Input Unload	Address	Signed Integer (16 bit)	Compressor
40606	Digital Input Clock Override	Address	Signed Integer (16 bit)	Compressor / Blower
40607	Digital Input Secondary Pressures	Address	Signed Integer (16 bit)	Compressor / Blower
40608	Digital Input VFD Fault	Address	Signed Integer (16 bit)	Compressor / Blower
40609	Reserved	--	--	--
40610	Digital Input Motor Aux	Address	Signed Integer (16 bit)	Compressor / Blower
40611	Digital Input Motor Fault	Address	Signed Integer (16 bit)	Compressor / Blower
40612	Digital Input Motor Over Temperature Alarm	Address	Signed Integer (16 bit)	Compressor / Blower
40613	Digital Input Motor Over Temperature Fault	Address	Signed Integer (16 bit)	Compressor / Blower
40614	Digital Input Cooler Aux	Address	Signed Integer (16 bit)	Compressor
40615	Reserved	--	--	--
40616	Reserved	--	--	--
40617	Digital Input Fan Fault	Address	Signed Integer (16 bit)	Compressor / Blower
40618	Digital Input Belt Break Fault	Address	Signed Integer (16 bit)	Compressor / Blower
40619	Reserved	--	--	--
40620	Digital Input Low Volt Relay Alarm	Address	Signed Integer (16 bit)	Compressor / Blower
40621	Digital Input Low Volt Relay Fault	Address	Signed Integer (16 bit)	Compressor / Blower
40622	Digital Input Phase Sequence Fault	Address	Signed Integer (16 bit)	Compressor / Blower
40623	Digital Input High Vibration Alarm	Address	Signed Integer (16 bit)	Compressor / Blower
40624	Digital Input High Vibration Fault	Address	Signed Integer (16 bit)	Compressor / Blower
40625	Reserved	--	--	--
40626	Reserved	--	--	--

Address	Parameter Description	Units	Data Type	Application
40627	Digital Input Enclosure Temperature	Address	Signed Integer (16 bit)	Blower
40628	Digital Input Air Filter Alarm	Address	Signed Integer (16 bit)	Compressor / Blower
40629	Digital Input Oil Filter Alarm	Address	Signed Integer (16 bit)	Compressor
40630	Digital Input Oil Level 1 Alarm	Address	Signed Integer (16 bit)	Blower
40631	Digital Input Oil Level 1 Fault	Address	Signed Integer (16 bit)	Blower
40632	Digital Input Oil Level 2 Alarm	Address	Signed Integer (16 bit)	Blower
40633	Digital Input Oil Level 2 Fault	Address	Signed Integer (16 bit)	Blower
40634	Digital Input Water Pressure Alarm	Address	Signed Integer (16 bit)	Compressor / Blower
40635	Digital Input Water Pressure Fault	Address	Signed Integer (16 bit)	Compressor / Blower
40636	Digital Input Heavy Consumption Start	Address	Signed Integer (16 bit)	Compressor / Blower
40637	Digital Input Heavy Consumption Load	Address	Signed Integer (16 bit)	Compressor / Blower
40638	Digital Input User Advisory Alarm	Address	Signed Integer (16 bit)	Compressor / Blower
40639	Digital Input User Shutdown Fault	Address	Signed Integer (16 bit)	Compressor / Blower
40640	Digital Input User Alarm Input	Address	Signed Integer (16 bit)	Compressor / Blower
40641	Digital Input User Fault Input	Address	Signed Integer (16 bit)	Compressor / Blower
40642	Digital Output Shutdown Fault	Address	Signed Integer (16 bit)	Compressor / Blower
40643	Digital Output Advisory Alarm	Address	Signed Integer (16 bit)	Compressor / Blower
40644	Digital Output Maintenance Alarm	Address	Signed Integer (16 bit)	Compressor / Blower
40645	Digital Output Any Alarm	Address	Signed Integer (16 bit)	Compressor / Blower
40646	Reserved	--	--	--
40647	Reserved	--	--	--
40648	Reserved	--	--	--
40649	Digital Output Main Contactor	Address	Signed Integer (16 bit)	Compressor / Blower
40650	Digital Output Start Contactor	Address	Signed Integer (16 bit)	Compressor / Blower
40651	Digital Output Cooler Contactor	Address	Signed Integer (16 bit)	Compressor
40652	Reserved	--	--	--
40653	Reserved	--	--	--
40654	Digital Output Inlet Valve	Address	Signed Integer (16 bit)	Compressor / Blower
40655	Digital Output Ivc	Address	Signed Integer (16 bit)	Compressor
40656	Digital Output Ivo	Address	Signed Integer (16 bit)	Compressor
40657	Digital Output Blowdown Valve	Address	Signed Integer (16 bit)	Compressor

Address	Parameter Description	Units	Data Type	Application
40658	Digital Output Unloader Valve	Address	Signed Integer (16 bit)	Blower
40659	Digital Output Tvc	Address	Signed Integer (16 bit)	Compressor
40660	Digital Output Tvo	Address	Signed Integer (16 bit)	Compressor
40661	Digital Output Oil Flow A	Address	Signed Integer (16 bit)	Compressor
40662	Digital Output Oil Flow B	Address	Signed Integer (16 bit)	Compressor
40663	Digital Output Oil Flow C	Address	Signed Integer (16 bit)	Compressor
40664	Reserved	--	--	--
40665	Reserved	--	--	--
40666	Digital Output Running	Address	Signed Integer (16 bit)	Compressor / Blower
40667	Digital Output Delayed Break Run	Address	Signed Integer (16 bit)	Compressor / Blower
40668	Reserved	--	--	--
40669	Reserved	--	--	--
40670	Reserved	--	--	--
40671	Reserved	--	--	--
40672	Reserved	--	--	--
40673	Reserved	--	--	--
40674	Digital Output Heavy Consumption	Address	Signed Integer (16 bit)	Compressor / Blower
40675	Reserved	--	--	--
40676	Digital Output Standby	Address	Signed Integer (16 bit)	Compressor / Blower
40677	Reserved	--	--	--
40678	Analog Input Inlet Pressure	Address	Signed Integer (16 bit)	Compressor / Blower
40679	Analog Input Interstage Pressure	Address	Signed Integer (16 bit)	2-Stage Compressor
40680	Reserved	--	--	--
40681	Analog Input Discharge Pressure	Address	Signed Integer (16 bit)	Compressor / Blower
40682	Analog Input Reservoir Pressure	Address	Signed Integer (16 bit)	Compressor
40683	Analog Input Separator Pressure	Address	Signed Integer (16 bit)	Compressor
40684	Analog Input Differential Pressure	Address	Signed Integer (16 bit)	Compressor / Blower
40685	Analog Input Plant Delivery Pressure	Address	Signed Integer (16 bit)	Compressor
40686	Analog Input System Pressure	Address	Signed Integer (16 bit)	Compressor / Blower
40687	Analog Input Oil Pressure	Address	Signed Integer (16 bit)	Compressor
40688	Reserved	--	--	--
40689	Analog Input Inlet Temperature	Address	Signed Integer (16 bit)	Compressor / Blower
40690	Analog Input Interstage Temperature	Address	Signed Integer (16 bit)	2-Stage Compressor
40691	Reserved	--	--	--

Address	Parameter Description	Units	Data Type	Application
40692	Analog Input Discharge Temperature	Address	Signed Integer (16 bit)	Compressor / Blower
40693	Analog Input Separator Temperature	Address	Signed Integer (16 bit)	Compressor
40694	Reserved	--	--	--
40695	Analog Input Plant Delivery Temperature	Address	Signed Integer (16 bit)	Compressor
40696	Reserved	--	--	--
40697	Analog Input Oil Temperature	Address	Signed Integer (16 bit)	Compressor
40698	Reserved	--	--	--
40699	Reserved	--	--	--
40700	Analog Input Enclosure Temperature	Address	Signed Integer (16 bit)	Blower
40701	Analog Input Current Sensor	Address	Signed Integer (16 bit)	Compressor
40702	Analog Input Oil Temp 1	Address	Signed Integer (16 bit)	Blower
40703	Analog Input Oil Temp 2	Address	Signed Integer (16 bit)	Blower
40704	Analog Input Oil Level 1	Address	Signed Integer (16 bit)	Blower
40705	Analog Input Oil Level 2	Address	Signed Integer (16 bit)	Compressor
40706	Reserved	--	--	--
40707	Analog Input Speed Control	Address	Signed Integer (16 bit)	Blower
40708	Reserved	--	--	--
40709	Reserved	--	--	--
40710	Reserved	--	--	--
40711	Analog Input User Input 1	Address	Signed Integer (16 bit)	Compressor / Blower
40712	Analog Input User Input 2	Address	Signed Integer (16 bit)	Compressor / Blower
40713	Aout Address Base	Address	Signed Integer (16 bit)	Compressor / Blower
40714	Analog Output Mixing Valve Cmd	Address	Signed Integer (16 bit)	Compressor
40715	Reserved	--	--	--
40716	Reserved	--	--	--
40717	Reserved	--	--	--
40718	Reserved	--	--	--
40719	Reserved	--	--	--
40720	Reserved	--	--	--

3.5.13 Display Input / Output

The following registers indicate the values of several analog inputs and outputs after they have been converted to the display units chosen by the user.

Table 3.18: Display I/O Registers

Address	Parameter Description	Units	Data Type	Application
40800	Reserved	--	--	--
40801	Display Inlet Pressure	1/10 Set Pressure Units	Unsigned Integer (16 bit)	Compressor / Blower
40802	Display Interstage Pressure	1/10 Set Pressure Units	Unsigned Integer (16 bit)	2-Stage Compressor
40803	Display Stage 2 Inlet Pressure	1/10 Set Pressure Units	Unsigned Integer (16 bit)	2-Stage Compressor
40804	Display Discharge Pressure	1/10 Set Pressure Units	Unsigned Integer (16 bit)	Compressor / Blower
40805	Display Reservoir Pressure	1/10 Set Pressure Units	Unsigned Integer (16 bit)	Compressor
40806	Display Separator Pressure	1/10 Set Pressure Units	Unsigned Integer (16 bit)	Compressor
40807	Display Differential Pressure	1/10 Set Pressure Units	Unsigned Integer (16 bit)	Compressor / Blower
40808	Display Plant Delivery Pressure	1/10 Set Pressure Units	Unsigned Integer (16 bit)	Compressor
40809	Display System Pressure	1/10 Set Pressure Units	Unsigned Integer (16 bit)	Compressor / Blower
40810	Display Oil Pressure	1/10 Set Pressure Units	Unsigned Integer (16 bit)	Compressor
40811	Reserved	--	--	--
40812	Display Inlet Temperature	1/10 Set Temperature Units	Unsigned Integer (16 bit)	Compressor / Blower
40813	Display Interstage Temperature	1/10 Set Temperature Units	Unsigned Integer (16 bit)	2-Stage Compressor
40814	Reserved	--	--	--
40815	Display Discharge Temperature	1/10 Set Temperature Units	Unsigned Integer (16 bit)	Compressor / Blower
40816	Display Separator Temperature	1/10 Set Temperature Units	Unsigned Integer (16 bit)	Compressor
40817	Reserved	--	--	--
40818	Display Plant Delivery Temperature	1/10 Set Temperature Units	Unsigned Integer (16 bit)	Compressor
40819	Reserved	--	--	--
40820	Reserved	--	--	--
40821	Reserved	--	--	--
40822	Reserved	--	--	--
40823	Display Enclosure Temperature	1/10 Set Temperature Units	Unsigned Integer (16 bit)	Blower
40824	Display Oil Temperature 1	1/10 Set Temperature Units	Unsigned Integer (16 bit)	Blower
40825	Display Oil Temperature 2	1/10 Set Temperature Units	Unsigned Integer (16 bit)	Blower
40826	Display Oil Level 1	1/10 Volts	Unsigned Integer (16 bit)	Blower
40827	Display Oil Level 2	1/10 Volts	Unsigned Integer (16 bit)	Blower

Address	Parameter Description	Units	Data Type	Application
40828	Display Current Sensor	1/10 Amps	Unsigned Integer (16 bit)	Compressor
40829	Reserved	--	--	--
40830	Display Remote Speed Control	1/10 Percent	Unsigned Integer (16 bit)	Blower
40831	Reserved	--	--	--
40832	Reserved	--	--	--
40833	Reserved	--	--	--
40834	Display User Input 1	User-defined	Unsigned Integer (16 bit)	Compressor / Blower
40835	Display User Input 2	User-defined	Unsigned Integer (16 bit)	Compressor / Blower

3.5.14 Raw Input and Output Values

The following registers represent raw data for digital and analog inputs and outputs. The digital registers indicate bit maps to and from the controller, and analog registers indicate a raw analog input or output value. Note that these values are not typically used in their raw form unless directed by Gardner Denver service.

Table 3.19: Raw I/O Registers

Address	Parameter Description	Units	Data Type
40900	Digital Inputs Group 0	None	Integer (16 bit)
40901	Digital Inputs Group 1	None	Integer (16 bit)
40902	Digital Inputs Group 2	None	Integer (16 bit)
40903	Digital Inputs Group 3	None	Integer (16 bit)
40904	Digital Outputs Group 0	None	Integer (16 bit)
40905	Digital Outputs Group 1	None	Integer (16 bit)
40906	Digital Outputs Group 2	None	Integer (16 bit)
40907	Digital Outputs Group 3	None	Integer (16 bit)
40908	Analog Input Channel 0	None	Integer (16 bit)
40909	Analog Input Channel 1	None	Integer (16 bit)
40910	Analog Input Channel 2	None	Integer (16 bit)
40911	Analog Input Channel 3	None	Integer (16 bit)
40912	Analog Input Channel 4	None	Integer (16 bit)
40913	Analog Input Channel 5	None	Integer (16 bit)
40914	Analog Input Channel 6	None	Integer (16 bit)
40915	Analog Input Channel 7	None	Integer (16 bit)
40916	Analog Input Channel 8	None	Integer (16 bit)
40917	Analog Input Channel 9	None	Integer (16 bit)
40918	Analog Input Channel 10	None	Integer (16 bit)
40919	Analog Input Channel 11	None	Integer (16 bit)
40920	Analog Input Channel 12	None	Integer (16 bit)

Address	Parameter Description	Units	Data Type
40921	Analog Input Channel 13	None	Integer (16 bit)
40922	Analog Input Channel 14	None	Integer (16 bit)
40923	Analog Input Channel 15	None	Integer (16 bit)
40924	Analog Output Channel 0	None	Integer (16 bit)
40925	Analog Output Channel 1	None	Integer (16 bit)
40926	Analog Output Channel 2	None	Integer (16 bit)
40927	Analog Output Channel 3	None	Integer (16 bit)
40928	Analog Output Channel 4	None	Integer (16 bit)
40929	Analog Output Channel 5	None	Integer (16 bit)
40930	Analog Output Channel 6	None	Integer (16 bit)
40931	Analog Output Channel 7	None	Integer (16 bit)
40932	Analog Output Channel 8	None	Integer (16 bit)
40933	Analog Output Channel 9	None	Integer (16 bit)
40934	Analog Output Channel 10	None	Integer (16 bit)
40935	Analog Output Channel 11	None	Integer (16 bit)
40936	Analog Output Channel 12	None	Integer (16 bit)
40937	Analog Output Channel 13	None	Integer (16 bit)
40938	Analog Output Channel 14	None	Integer (16 bit)
40939	Analog Output Channel 15	None	Integer (16 bit)

NOTES

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