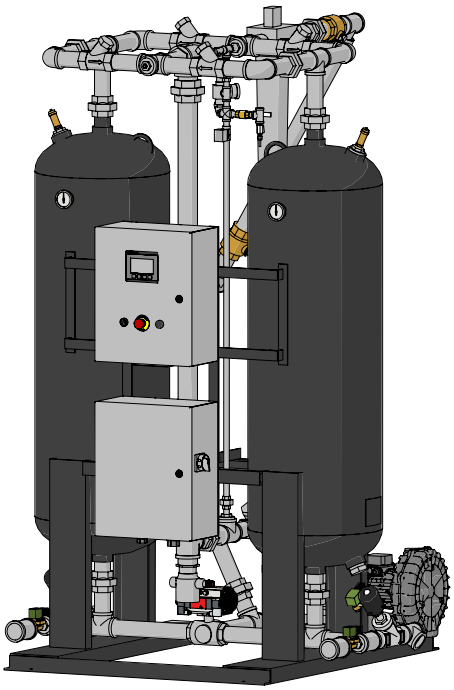
HRE/HBP Series Air Dryers

HRE-0100-1 through HRE-6000-4
HBP-0100-1 through HBP-6000-4



Manual

Scan to access www.AltecAIR.com

Altec AIR, LLC reserves the right to improve models and change specifications without notice.

100522630B

Air Dryer Registration

Take a moment to register your Altec AIR air dryer. Registering is necessary to activate the limited warranty. Once registered, you are eligible to receive free technical support, as well as updates concerning your Altec AIR products.

Register online at www.AltecAIR.com/product-support/registration/
or by phone at 1-800-521-5351 (option 2).

For updated and current warranty information, visit
www.AltecAIR.com/about-altecair/warranty.html.

Product information can be found on the data label.

Product Information

Model number _____ Serial number _____

Date purchased _____ Date installed _____

Distributor company name (if applicable) _____

Customer company name _____

Installation Location Information

Location name (if applicable) _____

Street address _____

City _____ State _____ ZIP code _____

Contact Information

Contact name _____

Phone number ( ) - ext. _____

Email _____

Scan to access www.AltecAIR.com

Altec AIR

41 Ward Road
Lancaster, NY 14086
1-800-943-7924

Model | S/N

Enclosure Type | Manufacturing Date

Max Flow | SCFM | Operating PSI | PSIG

Design PSI | MAWP | Max Temp | °F

Line Size

Volts | Phase | Amps

SCCR | kA | Wire

SUITABLE FOR USE ON A CIRCUIT CAPABLE OF DELIVERING NOT MORE THAN 5kA RMS SYSTEMETRICAL AMPERES 600V MAXIMUM

CONVIENT A L'UTILISATION DANS UN CIRCUIT CAPABLE DE LIVRER UN COURANT RMS SYMETRIQUE D'AU PLUS 5kA A, A UNE TENSION MAXIMALE DE 600V

www.altecair.com

Enclosed Industrial Control Panel Manufactured by: Altec AIR

41 Ward Road
Lancaster, NY 14086

Preface

The air dryer is the result of Altec AIR's advanced technology and quality awareness in design, engineering, and manufacturing. All information, illustrations, and specifications contained within the manual are based on the latest product information available at the time of publication. It is essential that all personnel involved in the use and/or care of the air dryer read and understand the manual. Keep the manual with the air dryer.

Given reasonable care and operation, according to the guidelines set forth in the manuals provided, this air dryer will provide many years of excellent service before requiring major maintenance.

Impacts to and excessive forces on the equipment, through accidents and the like, may result in structural damage not obvious during a visual inspection. If the equipment is subjected to such impacts or forces, a qualified person may need to perform additional testing such as pressure and leak tests, as applicable. If structural damage is suspected or found, contact Altec AIR for additional instructions.

NOTICE

Continued use of an air dryer with damage could lead to component failure.

Do not alter or modify the air dryer in any way that might affect the structural integrity or operational characteristics without the specific written approval of Altec AIR or an equivalent entity. Unauthorized alterations or modifications will void the warranty. Of greater concern, is the possibility that unauthorized modification could adversely affect the safe operation of this air dryer, resulting in personal injury and/or property damage.

California Proposition 65 Warning

WARNING

The air dryer may contain or emit chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Table of Contents

Section 1 — Introduction

About This Manual…

This manual provides information specific to Altec AIR HRE/HBP air dryers. The models covered include HRE-0100-1 through HRE-6000-4 and HBP-0100-1 through HBP-6000-4. This manual is written to provide an understanding of the air dryer including safety, specifications, installation, registration, operation, testing, maintenance, replacement parts, service, and troubleshooting. Observation and compliance with this manual will ensure the maximum life and efficiency of the air dryer.

Read this manual thoroughly prior to installing, operating, or servicing the air dryer to become familiar with the recommended procedures. This will minimize the possibility of personal injury or damage to the air dryer due to improper operation or handling.

Charts and figures are provided to support the text. Because options vary from one model to another, some figures may only be a representation of what is actually on the air dryer.

Contact the following organizations for additional information.

- American National Standards Institute (ANSI)
- American Society of Mechanical Engineers (ASME)
- Canadian Registration Number (CRN)
- Compressed Air and Gas Institute (CAGI)
- Electrical Testing Laboratories (ETL)
- International Society of Automation (ISA)
- National Electrical Manufacturers Association (NEMA)
- Occupational Safety and Health Administration (OSHA)
- Underwriters Laboratories (UL)

The Appendix contains reference items to assist in air dryer operation and maintenance.

This symbol is used throughout this manual to indicate danger, warning, and caution instructions. These instructions must be followed to reduce the likelihood of personal injury and/or property damage.

The terms danger, warning, caution, and notice represent varying degrees of personal injury and/or property damage that could result if the preventive instructions are not followed. The following paragraphs from ANSI publications explain each term.

Danger
Indicates a hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

Warning
Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

Caution
Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

Notice
Indicates information considered important, but not hazard related.

Additional Resources

A digital version of this manual is provided online through Altec AIR. To access Altec AIR, scan the QR code on the cover of this manual or go to www.AltecAIR.com.

Additional print copies of this manual may be ordered through your Altec AIR representative. Supply the model and serial number located on the data label and the manual part number from the front cover to assure that the proper manual will be supplied.

Section 2 — Air Dryer Specifications

Purpose of the Air Dryer

This heat regenerative desiccant air dryer has been specifically designed, manufactured, and tested for the purpose of reducing the humidity in compressed air. Any other use is considered improper. Altec AIR is not responsible for any problem due to improper use. Outlet air from the air dryer is not intended for use in breathing, food, or other sterile applications.

Proper use requires the following to adhere to the installation instructions.

- Main power source voltage and frequency
- Flow rate, pressure, and temperature of the inlet air
- Inlet air quality (dirty air with solid particulates not acceptable)
- Ambient temperature

HRE and HBP Series air dryers share many characteristics of design and functionality. The two series differ primarily in how they remove water vapor from the desiccant in the offline tower.

In HRE Series air dryers, compressed air saturated with water vapor flows upward through the online (drying) tower, where water molecules adhere to the desiccant. The majority of the dry air then leaves the system through the outlet port. A regulated amount (7.5 percent) of dried air is heated with a low watt density heater and then passes down through the offline tower, where it removes the water vapor that adhered to the desiccant in the previous cycle.

In HBP Series air dryers, compressed air saturated with water vapor flows upward through the online (drying) tower, where water molecules adhere to the desiccant. The dry air leaves the system through the outlet port. An external blower directs atmospheric air through a low watt density heater and down through the offline tower, where it removes the water vapor that adhered to the desiccant in the previous cycle.

General Specifications

The heat regenerative desiccant air dryer series is designed to meet the demand of the compressed air system. HRE/HBP Series models range from 100 to 6,000 standard cubic feet per minute (SCFM).

- Consistent and reliable dry air at -40 degrees Fahrenheit (-40 degrees Celsius) outlet dew point

- ASME/CRN approved pressure vessels

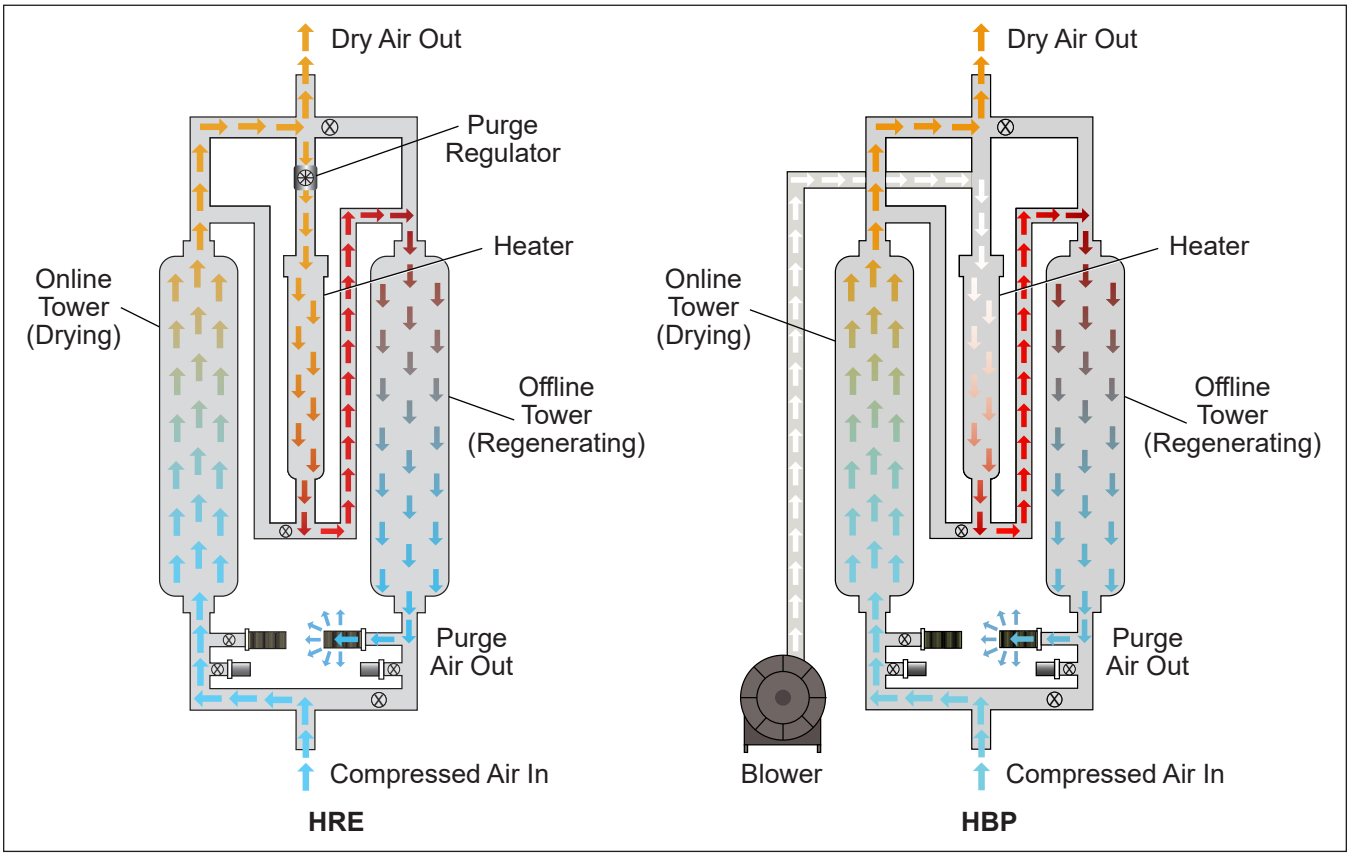
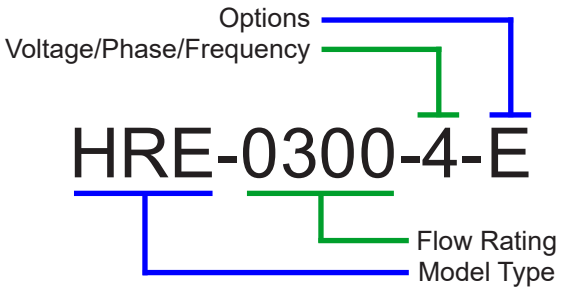


Figure 2.1 — Flow Diagrams

- Factory installed filters with differential pressure gauges and pre-filter timer drain
- Tower pressure gauges and dew point indicators provide simple and reliable indicators of the dryer's performance
- Feature-rich ETL listed programmable logic controller (PLC) with NEMA 4X enclosure
- Industrial duty blower (HBP Series only)
- Welded frame base allows the dryer to be easily moved with a forklift
- Desiccant fill and drain ports allow for easy replacement of desiccant (models with inlet flow of 1,250 SCFM and larger)
- OSHA approved mufflers for noise reduction
- Inlet and outlet connections allow for easy installation of the air dryer, filters, and bypass valves

Heat Regenerative Desiccant Series Air Dryer Models



Item	HRE	HBP
Inlet temperature	100°F (38°C)	100°F (38°C)
Inlet dew point	100°F (38°C)	100°F (38°C)
Inlet air	100 PSIG*	100 PSIG
Outlet dew point	100°F (38°C)	-40°F (-40°C)

* Pounds per square inch gauge

Figure 2.2 — Model Types

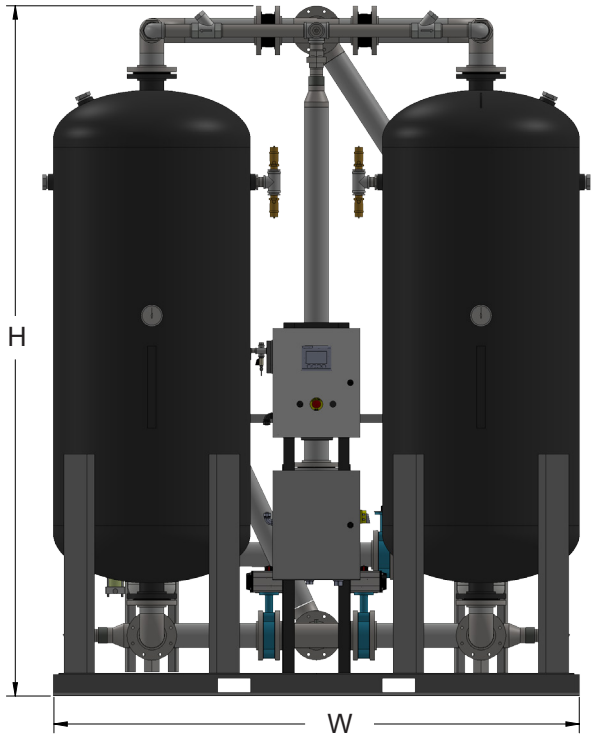
Flow Rating
Flow rates are 100 to 6,000 SCFM. Contact Altec AIR for more information about models with larger flow ratings.

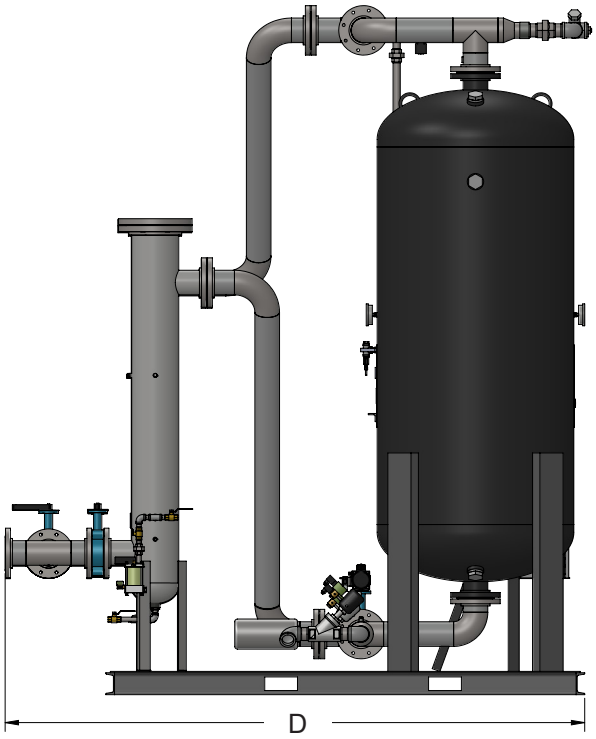
Nominal Voltage/Phase/Frequency
- 1 - 120V/1Ph/60 Hz
- 2 - 230V/1Ph/60 Hz
- 4 - 460V/3Ph/60 Hz
- 5 - 575V/3Ph/60 Hz (option for -0250 units and above)

Options
Several additional letters and numbers may be added to the model number printed on the air dryer's data label. Labels for standard options are listed. Contact Altec AIR for more information about advanced options not listed here.

- E - EcoTronic
- 3 - Three-way bypass
- 7 - Seven-way bypass and dual selectable pre-filter
- 9 - Nine-way bypass and dual selectable pre- and post-filter
- T - Tower insulation
- L - Outdoor low ambient temperature kit -20 degrees Fahrenheit (-29 degrees Celsius)
- L1 - Indoor low ambient temperature kit -20 degrees Fahrenheit (-29 degrees Celsius)

The specifications for the air dryer vary by model and series (refer to Figures 2.3 and 2.4).

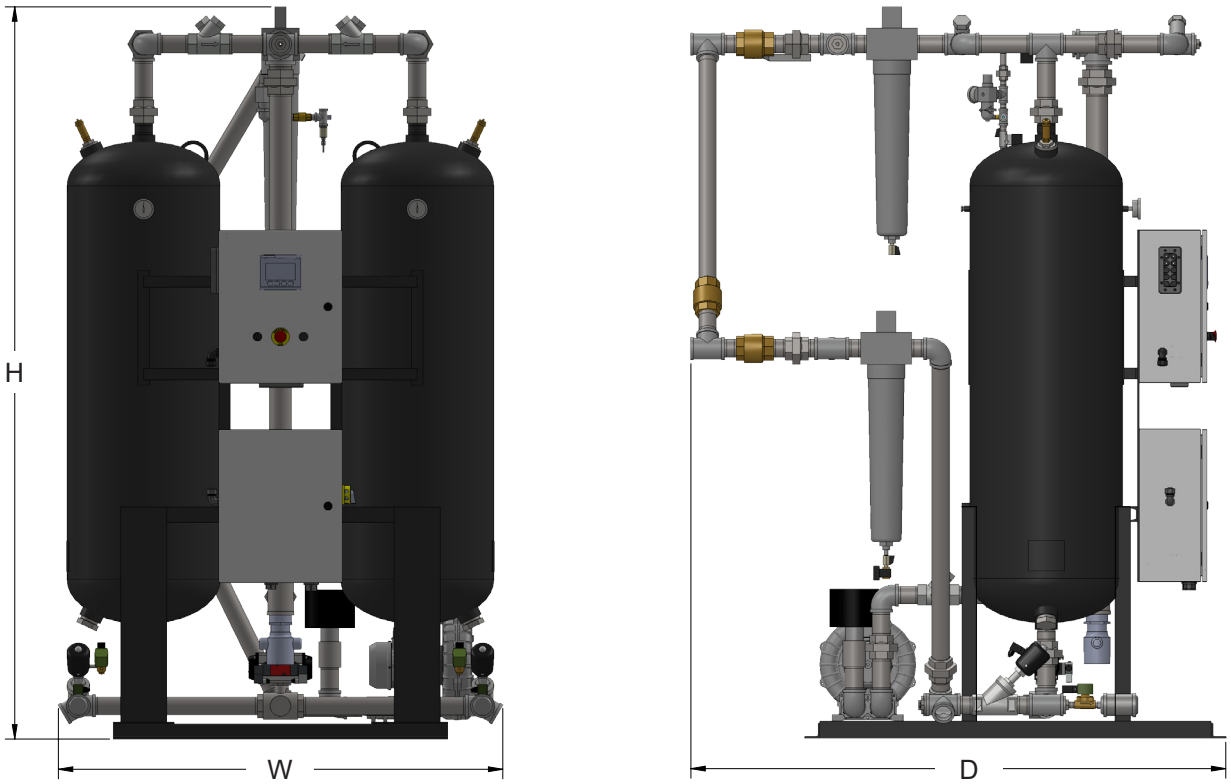




Model	Inlet Flow (SCFM at 100 PSIG)	Inlet/Outlet Ports NPT	Power Requirement	Heater (kW)	Approx. Purge (SCFM)	Dimensions W x D x H (in)	Weight (lbs)
HRE-0100-1	100	1"	120V-1Ph-60 Hz	1.5	8	27 x 30 x 79	550
HRE-0130-1	130	1"	120V-1Ph-60 Hz	1.5	10	27 x 32 x 79	630
HRE-0200-2	200	1 1/2"	230V-1Ph-60 Hz	3.0	15	31 x 36 x 90	940
HRE-0250-4	250	1 1/2"	460V-3Ph-60 Hz	3.0	19	31 x 38 x 91	1,018
HRE-0300-4	300	1 1/2"	460V-3Ph-60 Hz	3.0	23	31 x 38 x 91	1,095
HRE-0400-4	400	2"	460V-3Ph-60 Hz	5.0	30	32 x 40 x 94	1,390
HRE-0550-4	550	2"	460V-3Ph-60 Hz	6.0	41	44 x 49 x 93	1,700
HRE-0650-4	650	2"	460V-3Ph-60 Hz	7.5	49	44 x 52 x 93	1,855
HRE-0800-4	800	2"	460V-3Ph-60 Hz	9.0	60	44 x 52 x 98	2,270
HRE-1000-4	1,000	3"[1]	460V-3Ph-60 Hz	12.0	75	52 x 48 x 102	2,900
HRE-1250-4	1,250	3"[1]	460V-3Ph-60 Hz	12.0	94	96 x 70 x 101	4,180
HRE-1500-4	1,500	3"[1]	460V-3Ph-60 Hz	18.0	113	96 x 70 x 101	4,530
HRE-2000-4	2,000	4"[1]	460V-3Ph-60 Hz	25.0	150	96 x 84 x 121	6,210
HRE-2500-4	2,500	4"[1]	460V-3Ph-60 Hz	25.0	185	96 x 84 x 127	6,795
HRE-3000-4	3,000	4"[1]	460V-3Ph-60 Hz	30.0	225	90 x 92 x 112	7,620
HRE-4000-4[2]	4,000	6"[1]	460V-3Ph-60 Hz	38.0	300	117 x 127 x 112	9,565
HRE-5000-4[2]	5,000	6"[1]	460V-3Ph-60 Hz	50.0	375	133 x 116 x 105	11,055
HRE-6000-4[2]	6,000	6"[1]	460V-3Ph-60 Hz	60.0	450	145 x 123 x 104	14,125

[1] Flange
[2] Units 4,000 SCFM and larger with factory packaged filters are provided on two bases designed to bolt together during installation.

Figure 2.3 — HRE Series Unit Specifications

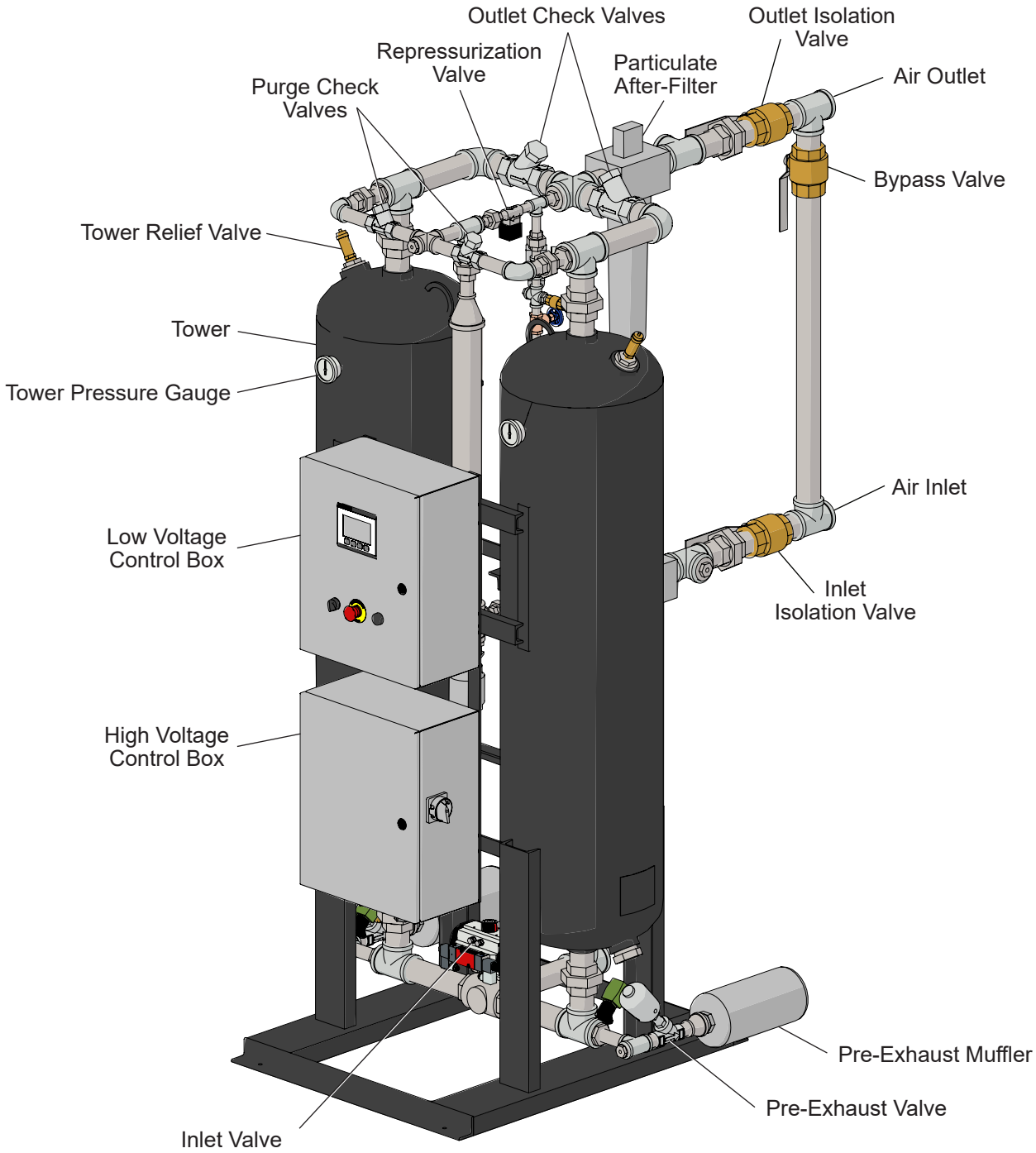


Model	Inlet Flow (SCFM at 100 PSIG)	Inlet/Outlet Ports NPT	Power Requirement	Heater (kW)	Dimensions W x D x H (in)	Weight (lbs)
HBP-0100-1	100	1"	120V-1Ph-60 Hz	1.5	27 x 37 x 80	650
HBP-0130-1	130	1"	120V-1Ph-60 Hz	2.2	27 x 37 x 80	705
HBP-0200-2	200	1 1/2"	230V-1Ph-60 Hz	3.0	32 x 40 x 91	950
HBP-0250-4	250	1 1/2"	460V-3Ph-60 Hz	3.0	26 x 44 x 91	1,095
HBP-0300-4	300	1 1/2"	460V-3Ph-60 Hz	6.0	26 x 44 x 91	1,240
HBP-0400-4	400	2"	460V-3Ph-60 Hz	7.5	32 x 48 x 94	1,595
HBP-0550-4	550	2"	460V-3Ph-60 Hz	12.0	44 x 55 x 96	1,880
HBP-0650-4	650	2"	460V-3Ph-60 Hz	12.0	44 x 55 x 96	2,030
HBP-0800-4	800	2"	460V-3Ph-60 Hz	15.0	44 x 59 x 98	2,595
HBP-1000-4	1,000	3"[1]	460V-3Ph-60 Hz	18.0	48 x 65 x 103	2,845
HBP-1250-4	1,250	3"[1]	460V-3Ph-60 Hz	25.0	90 x 74 x 100	4,885
HBP-1500-4	1,500	3"[1]	460V-3Ph-60 Hz	25.0	90 x 74 x 100	5,260
HBP-2000-4	2,000	4"[1]	460V-3Ph-60 Hz	38.0	96 x 84 x 121	7,065
HBP-2500-4	2,500	4"[1]	460V-3Ph-60 Hz	50.0	96 x 84 x 126	8,030
HBP-3000-4	3,000	4"[1]	460V-3Ph-60 Hz	50.0	90 x 94 x 112	8,630
HBP-4000-4[2]	4,000	6"[1]	460V-3Ph-60 Hz	75.0	120 x 123 x 113	13,985
HBP-5000-4[2]	5,000	6"[1]	460V-3Ph-60 Hz	90.0	163 x 129 x 117	16,055
HBP-6000-4[2]	6,000	6"[1]	460V-3Ph-60 Hz	110.0	172 x 135 x 116	18,380

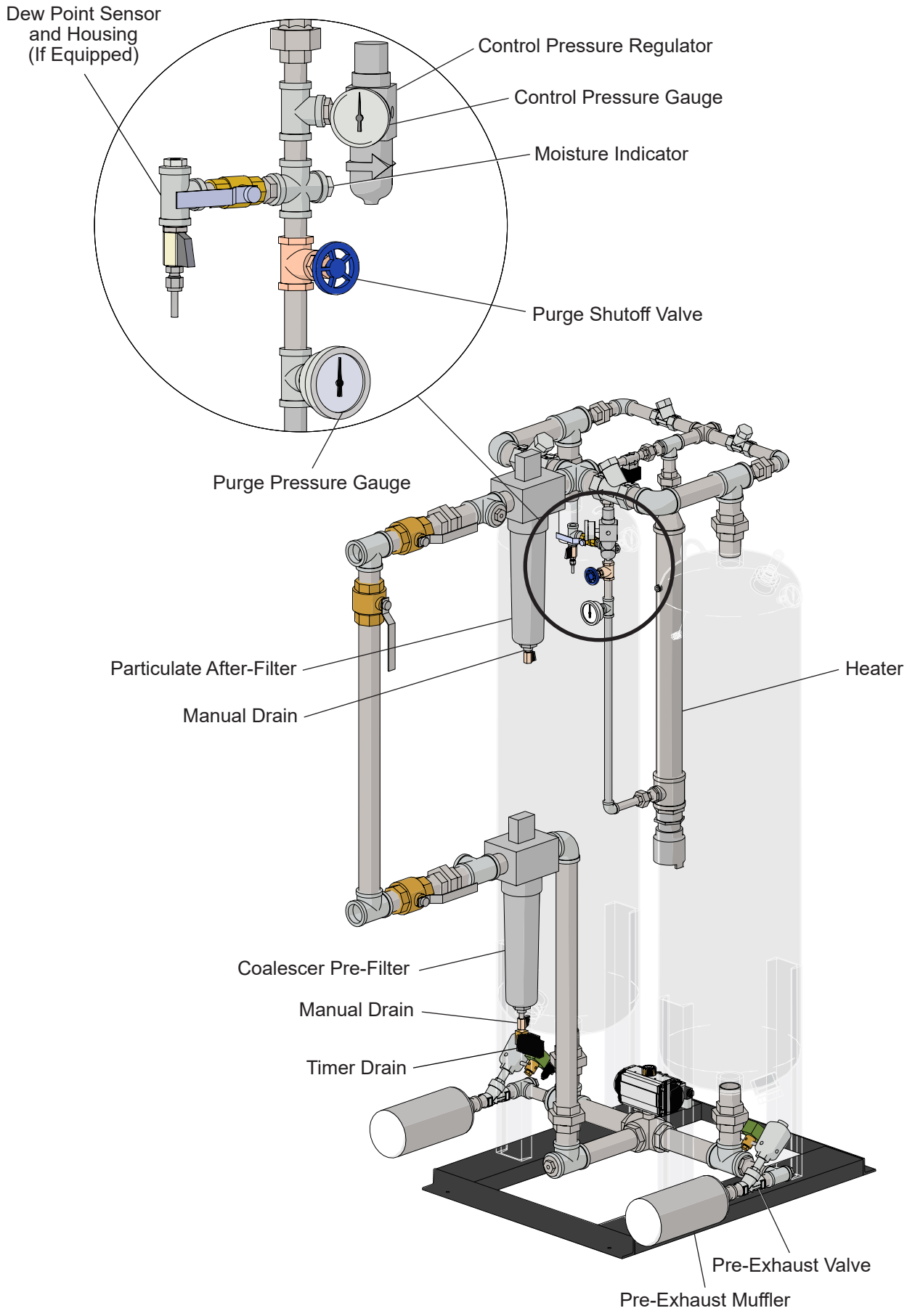
[1] Flange
[2] Units 4,000 SCFM and larger with factory packaged filters are provided on two bases designed to bolt together during installation.

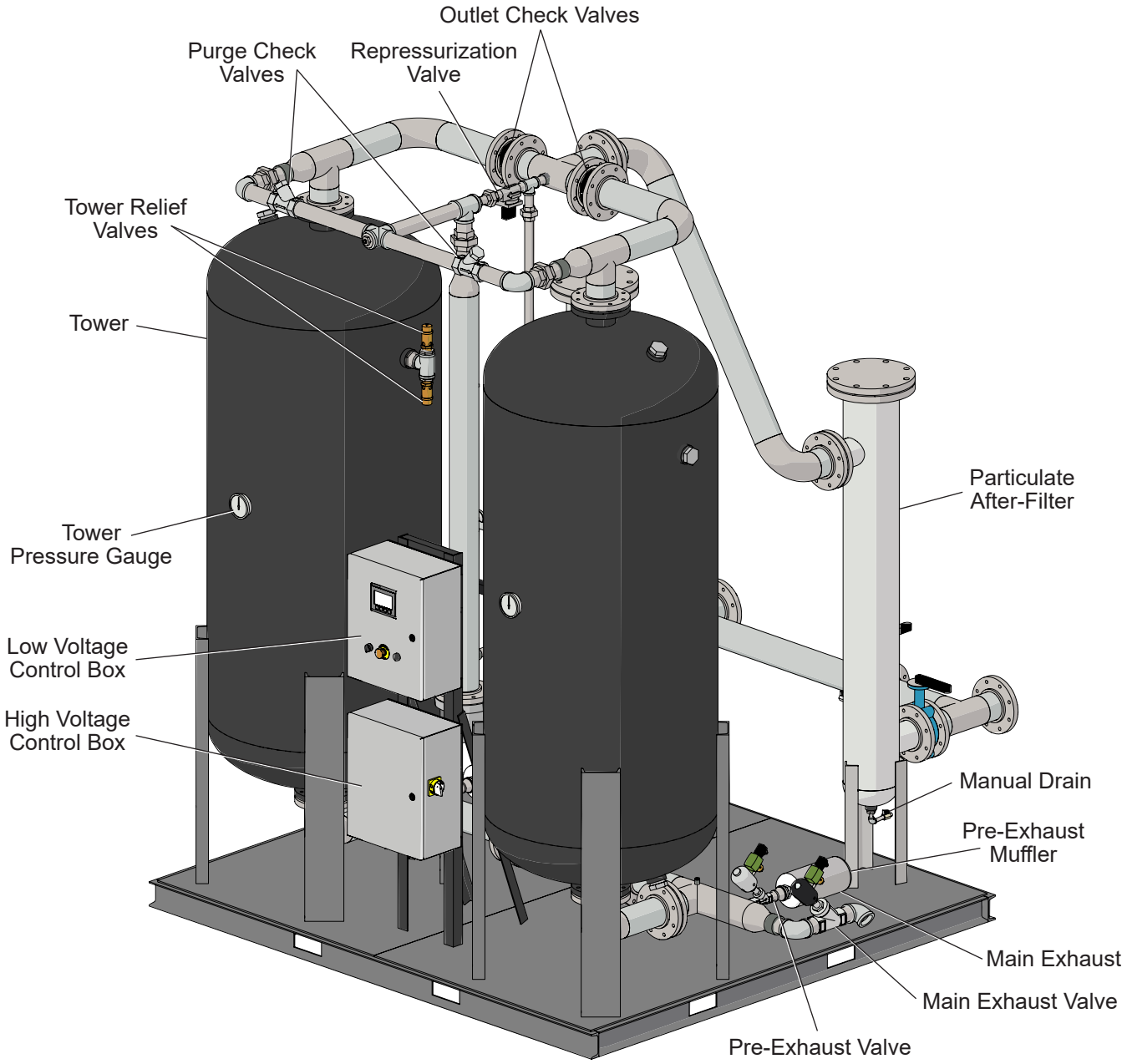
Figure 2.4 — HBP Series Unit Specifications

Component Identification

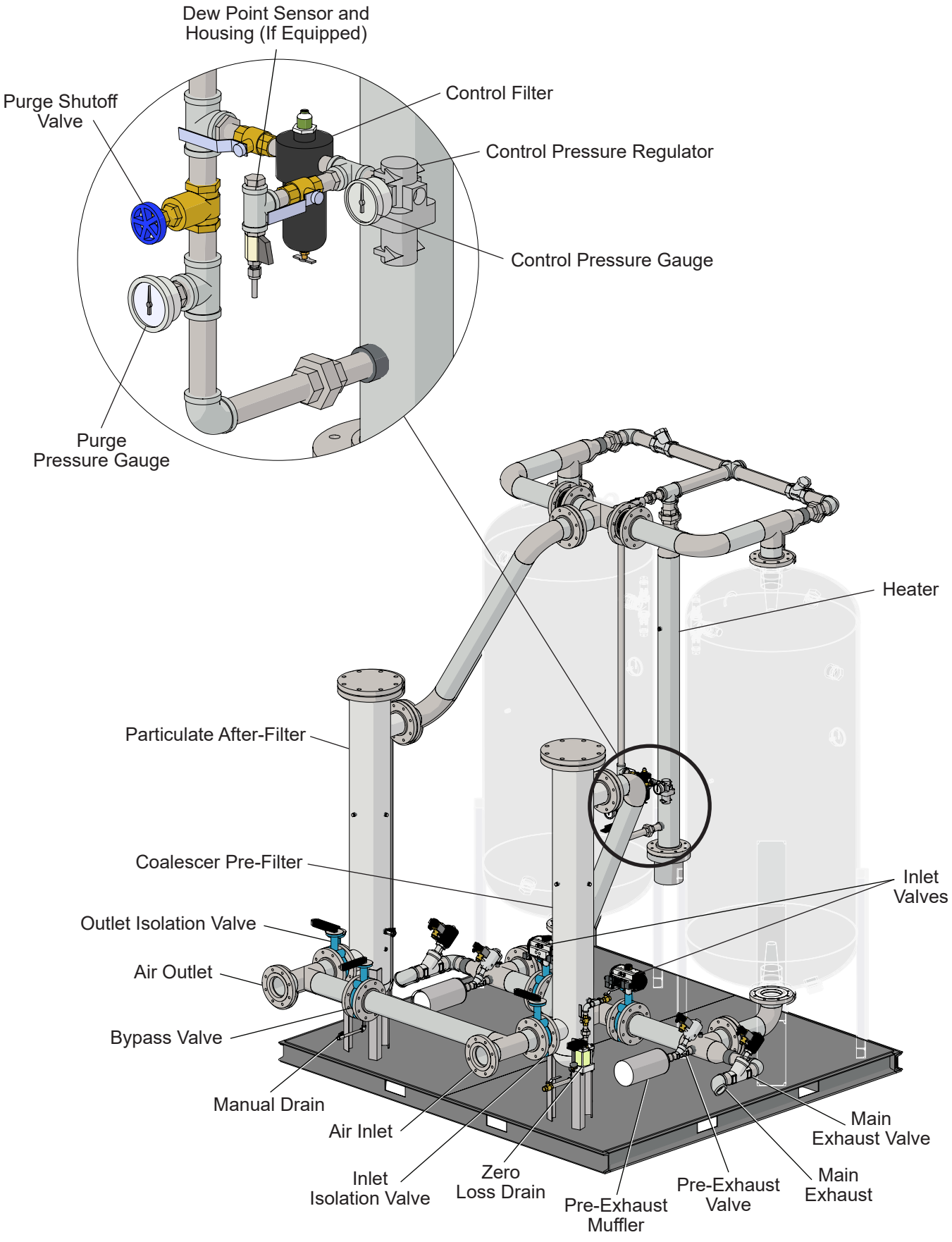


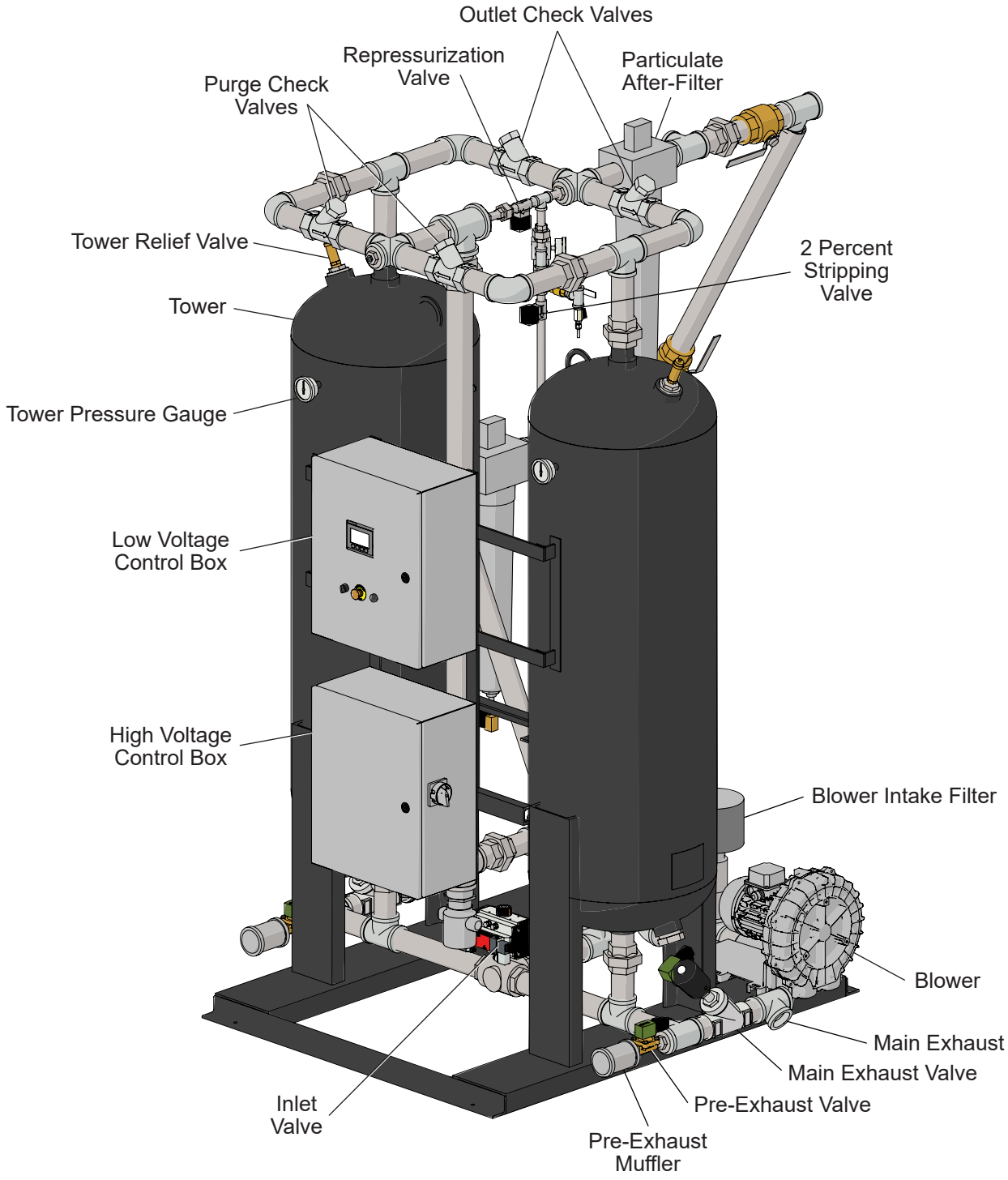
HRE-0400-4


Dew Point Sensor
and Housing
(If Equipped)
Control Pressure Regulator
Control Pressure Gauge
Moisture Indicator
Purge Shutoff Valve
Purge Pressure Gauge
Particulate After-Filter
Manual Drain
Heater
Coalescer Pre-Filter
Manual Drain
Timer Drain
Pre-Exhaust Valve
Pre-Exhaust Muffler

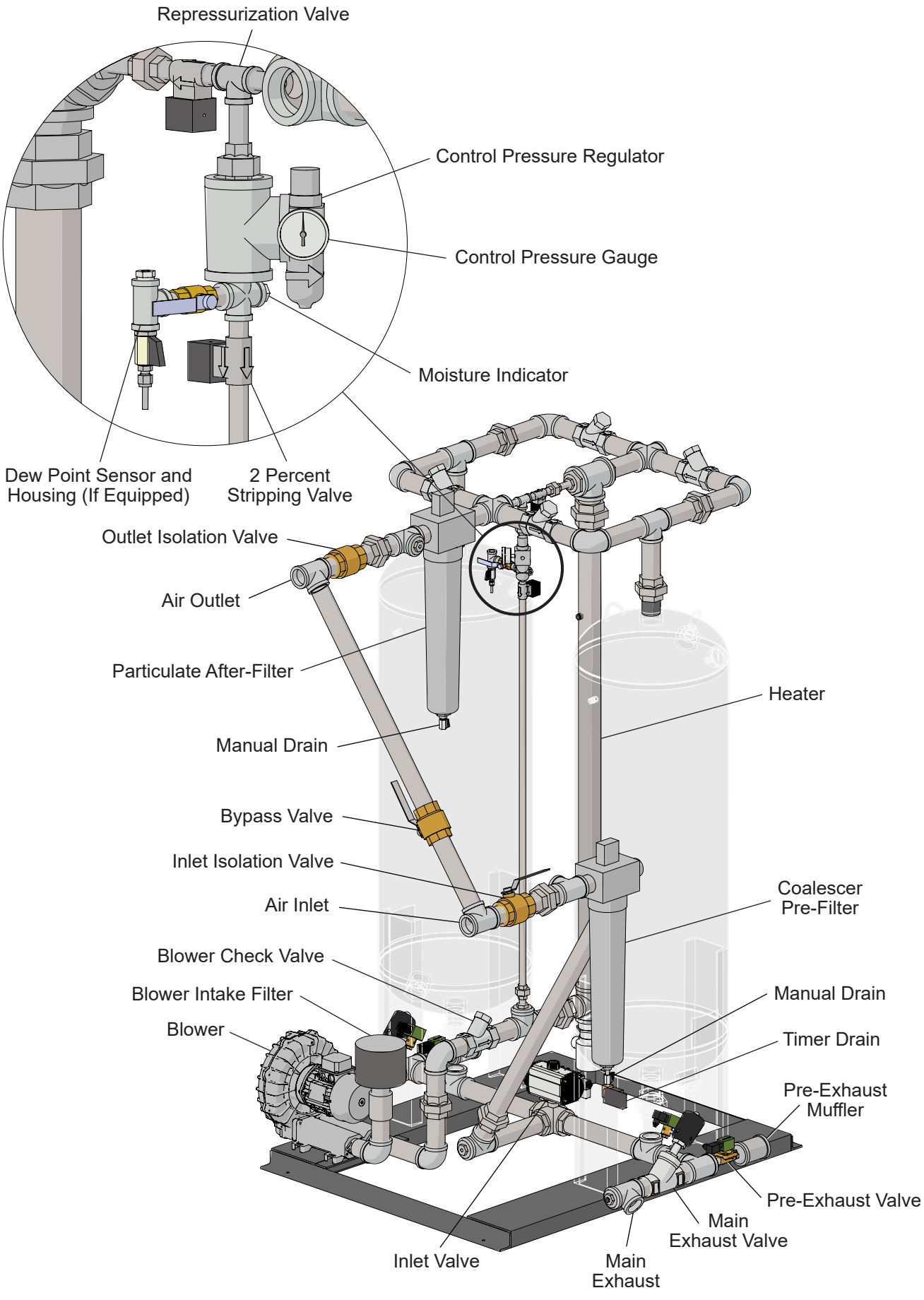

Outlet Check Valves
Purge Check Valves
Repressurization Valve
Tower Relief Valves
Tower
Particulate After-Filter
Tower Pressure Gauge
Low Voltage Control Box
High Voltage Control Box
Manual Drain
Pre-Exhaust Muffler
Main Exhaust
Main Exhaust Valve
Pre-Exhaust Valve

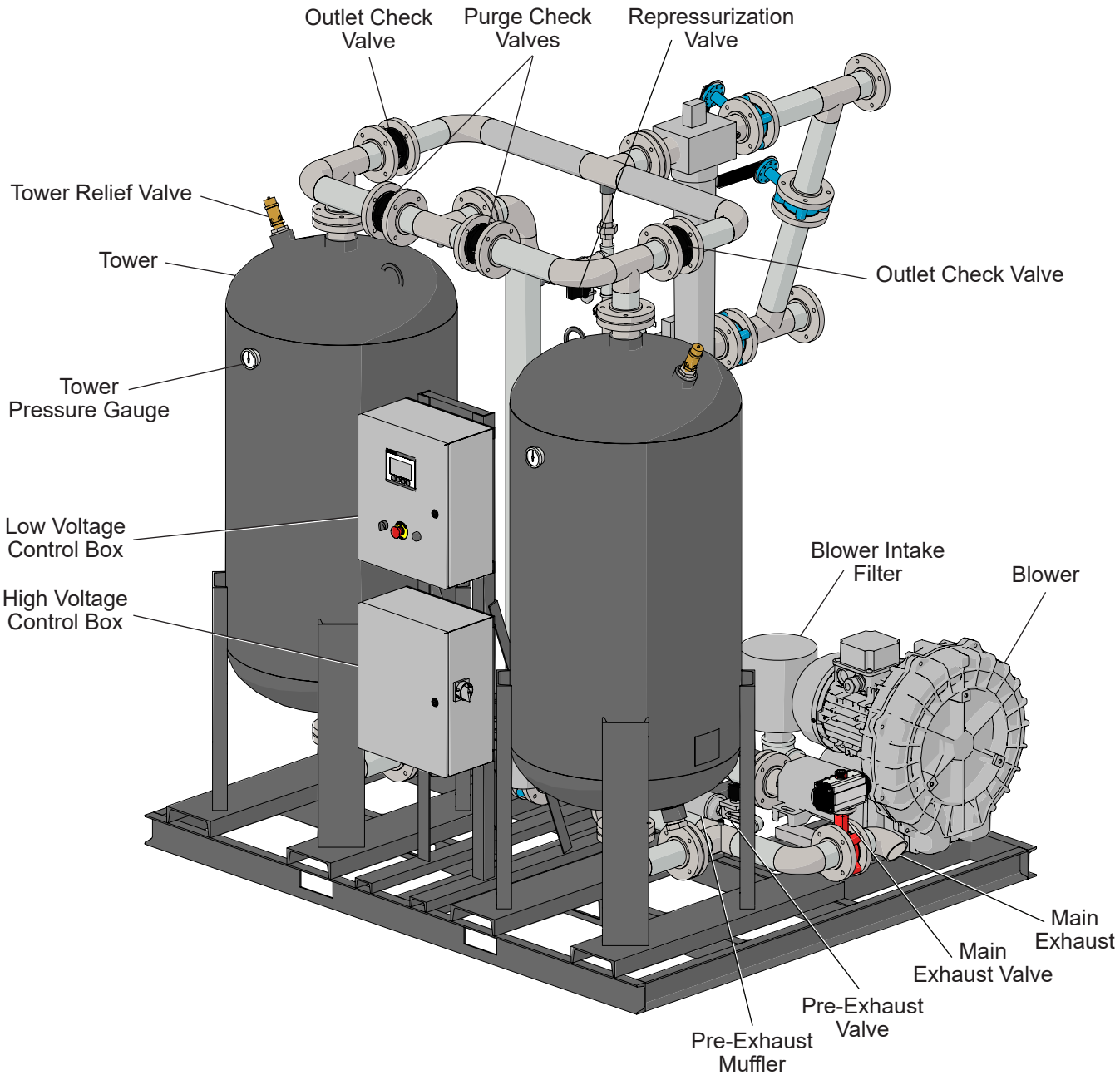
HRE-2500-4


Dew Point Sensor and Housing (If Equipped)
Purge Shutoff Valve
Control Filter
Control Pressure Regulator
Control Pressure Gauge
Purge Pressure Gauge
Heater
Particulate After-Filter
Coalescer Pre-Filter
Inlet Valves
Outlet Isolation Valve
Air Outlet
Bypass Valve
Manual Drain
Air Inlet
Inlet Isolation Valve
Zero Loss Drain
Pre-Exhaust Muffler
Pre-Exhaust Valve
Main Exhaust
Main Exhaust Valve

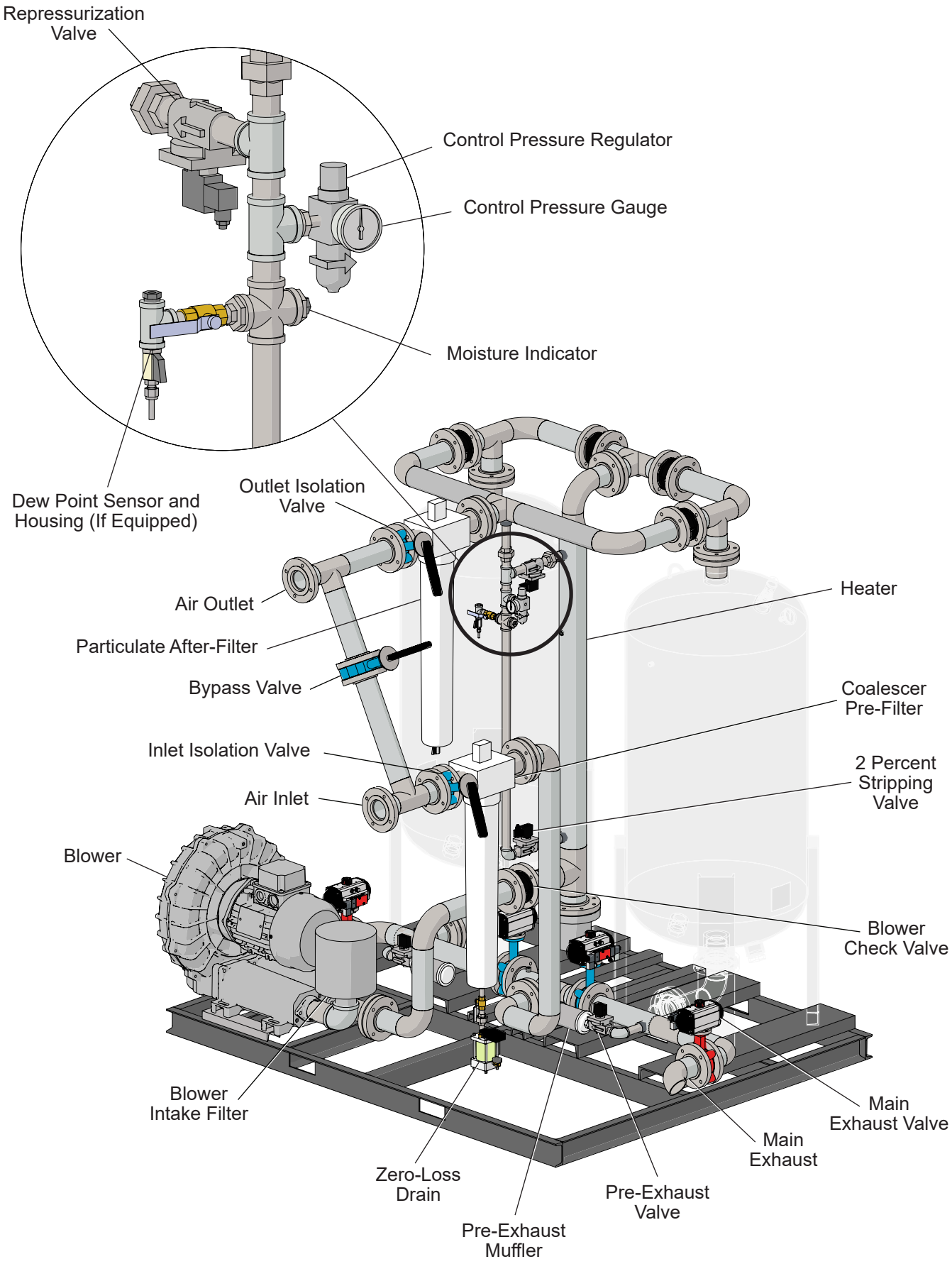

Outlet Check Valves
Repressurization Valve
Particulate After-Filter
Purge Check Valves
Tower Relief Valve
2 Percent Stripping Valve
Tower
Tower Pressure Gauge
Low Voltage Control Box
High Voltage Control Box
Blower Intake Filter
Blower
Main Exhaust
Main Exhaust Valve
Pre-Exhaust Valve
Inlet Valve
Pre-Exhaust Muffler

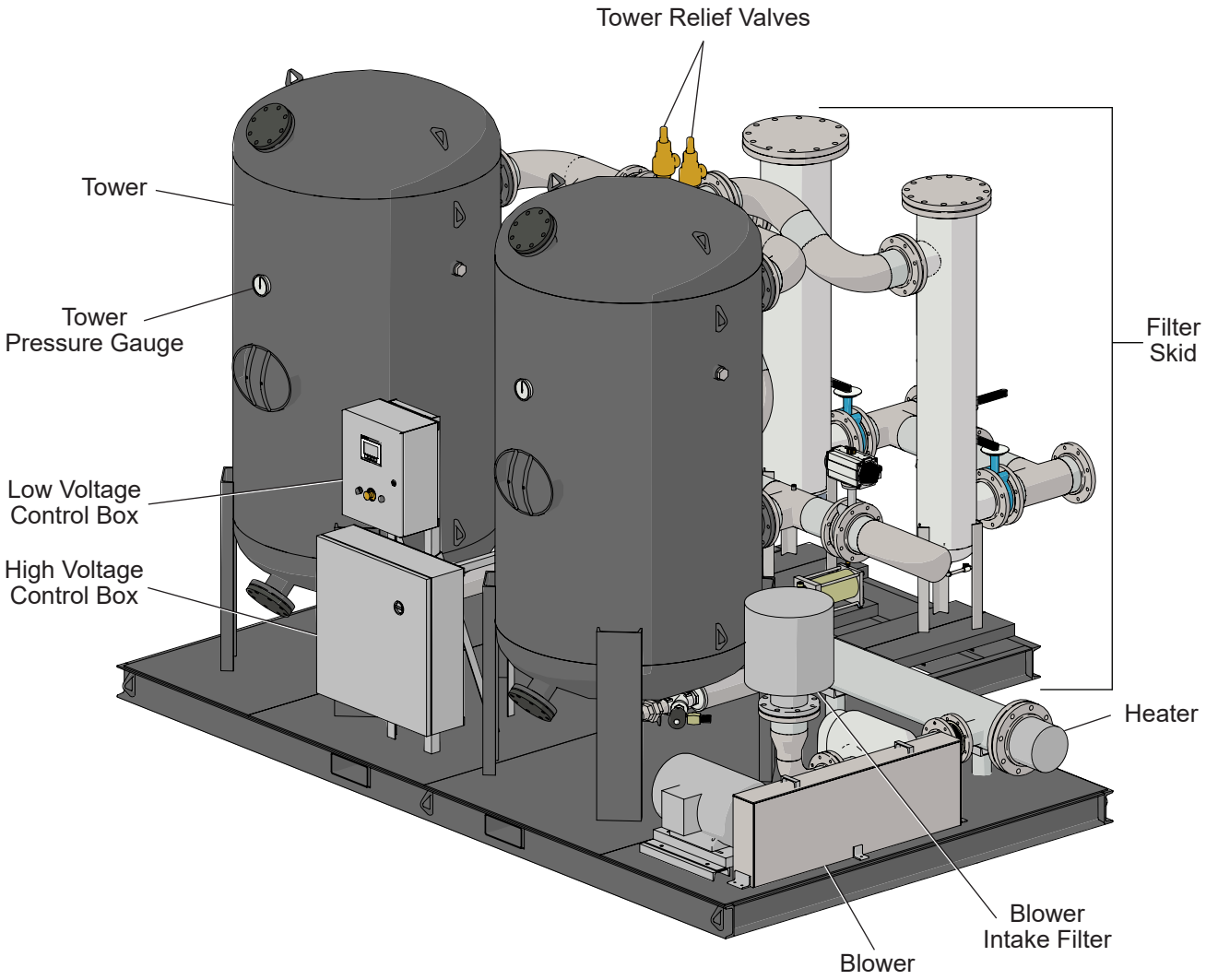
HBP-0550-4


Repressurization Valve
Control Pressure Regulator
Control Pressure Gauge
Moisture Indicator
Dew Point Sensor and Housing (If Equipped)
2 Percent Stripping Valve
Outlet Isolation Valve
Air Outlet
Particulate After-Filter
Heater
Manual Drain
Bypass Valve
Inlet Isolation Valve
Air Inlet
Coalescer Pre-Filter
Blower Check Valve
Blower Intake Filter
Blower
Manual Drain
Timer Drain
Pre-Exhaust Muffler
Pre-Exhaust Valve
Main Exhaust Valve
Inlet Valve
Main Exhaust

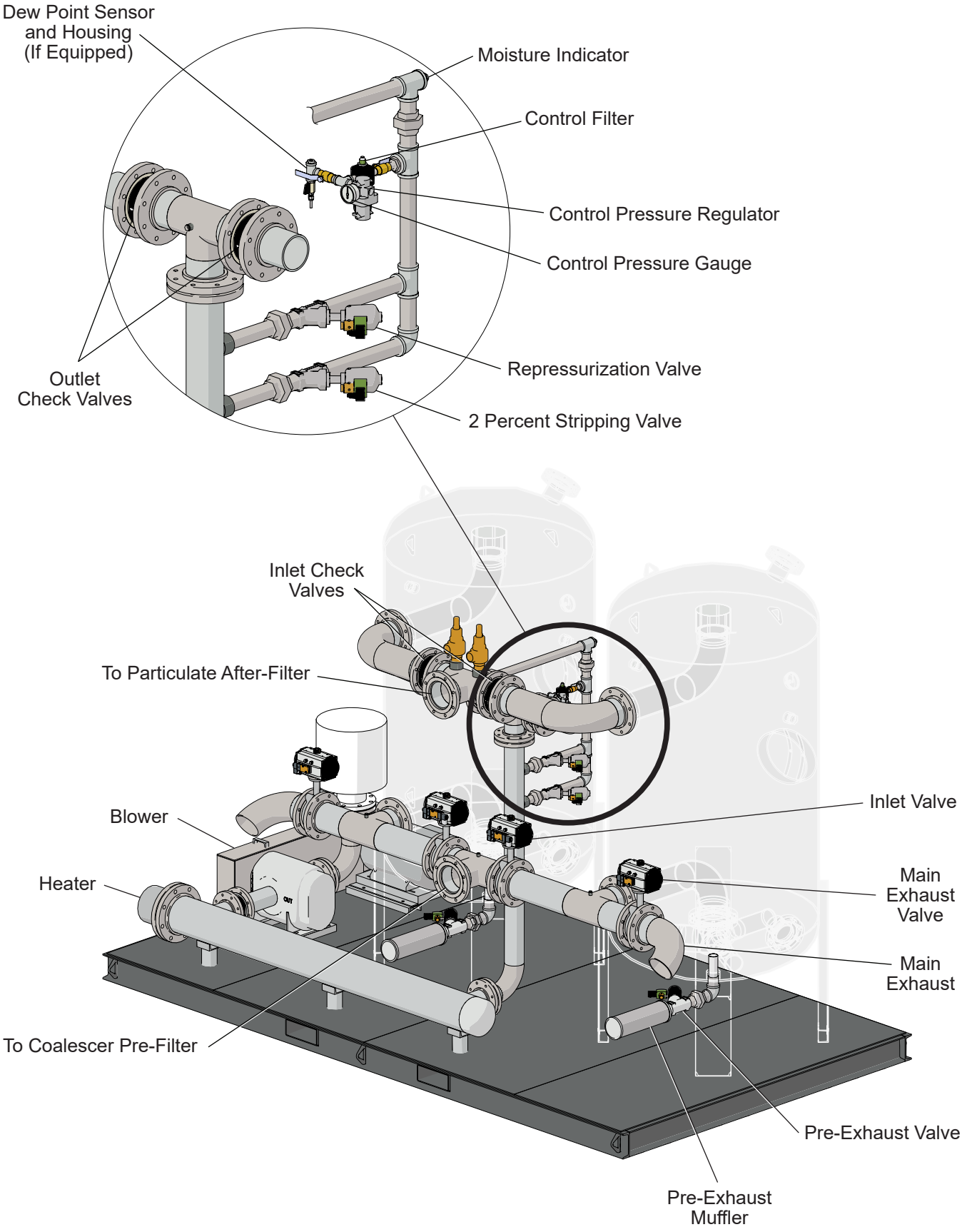

Outlet Check Valve
Purge Check Valves
Repressurization Valve
Tower Relief Valve
Tower
Outlet Check Valve
Tower Pressure Gauge
Low Voltage Control Box
High Voltage Control Box
Blower Intake Filter
Blower
Main Exhaust
Main Exhaust Valve
Pre-Exhaust Valve
Pre-Exhaust Muffler

HBP-1500-4

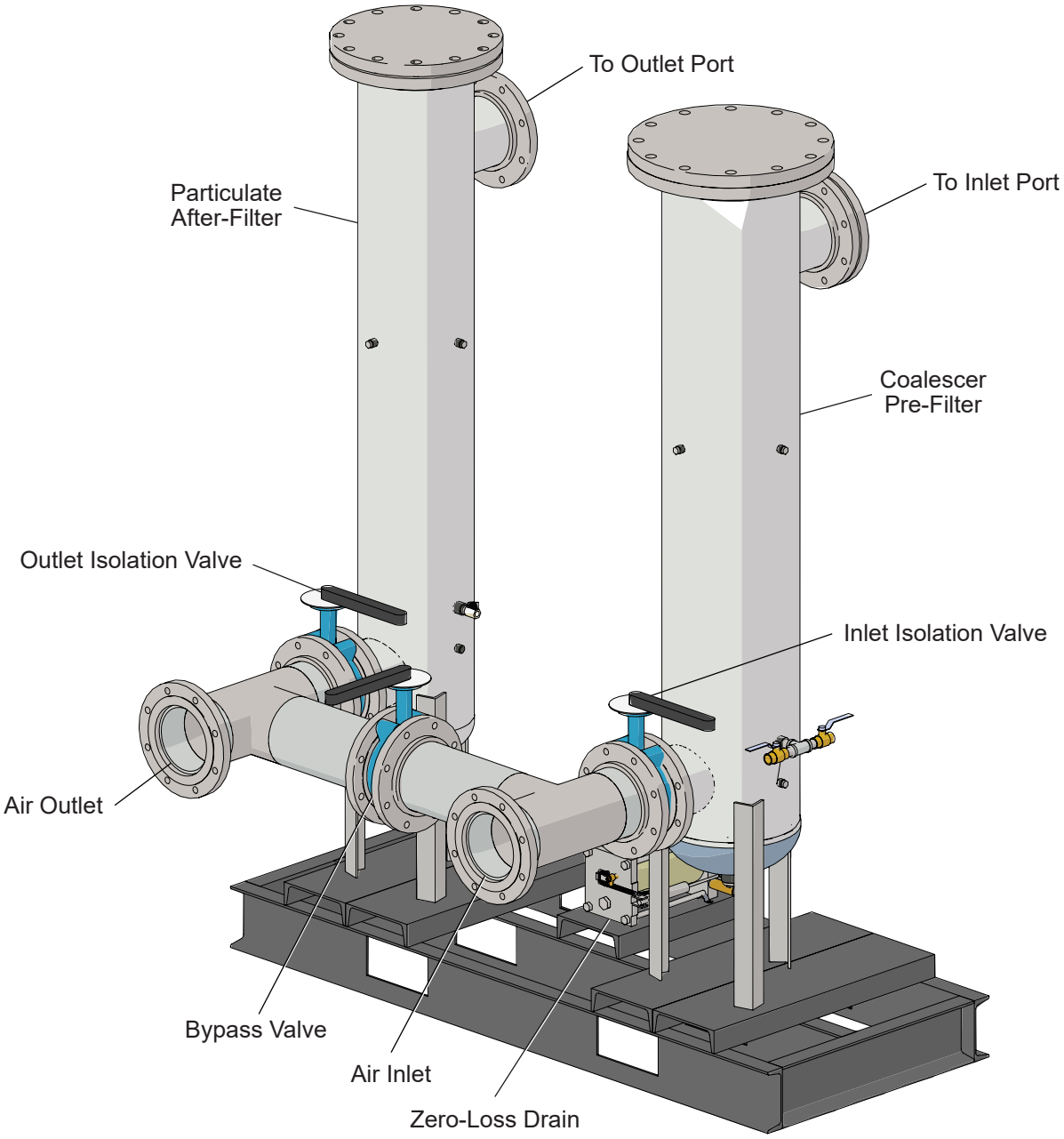

Repressurization Valve
Control Pressure Regulator
Control Pressure Gauge
Moisture Indicator
Dew Point Sensor and Housing (If Equipped)
Outlet Isolation Valve
Air Outlet
Heater
Particulate After-Filter
Bypass Valve
Coalescer Pre-Filter
Inlet Isolation Valve
2 Percent Stripping Valve
Air Inlet
Blower
Blower Check Valve
Blower Intake Filter
Main Exhaust Valve
Main Exhaust
Zero-Loss Drain
Pre-Exhaust Valve
Pre-Exhaust Muffler



HBP-5000-5 Front View



HBP-5000-5 Rear View (Without Filter Skid)



HBP-5000-5 Filter Skid

Section 3 — Safety

Safety Instructions

This section contains general information about safety and warning points to consider and adhere to during installation, operation, and maintenance of the air dryer. Read this section before performing any operation or procedure on the air dryer.

Safety alerts throughout this manual highlight situations in which accidents can occur. Pay special attention to all safety alerts.

⚠ WARNING

Follow all of the information in this manual to minimize the risk of electric shock, and prevent property damage or personal injury.

Stored energy may contain hazardous voltage. Be sure all capacitors are discharged before servicing the air dryer.

Avoid contact with live electrical circuits. Many procedures performed during installation, operation, testing, and maintenance of the air dryer require the air dryer to be energized, creating a situation for potential electric shock. Remove all jewelry before performing any procedures.

To avoid electrical overload and shock hazard, incoming power to the air dryer must be sized according to air dryer specifications.

⚠ CAUTION

Internal surfaces may be hot. Be careful when coming into contact with internal components as there is a potential for some of these components to become hot when in operation or standby.

Proper installation and maintenance as outlined in this manual is extremely important to ensure the reliability and longevity of the air dryer as well as prevent damage or personal injury.

Depressurizing the air dryer may be necessary before performing certain procedures.

NOTICE

Perform routine maintenance to ensure optimal performance over the life cycle of the air dryer. Performing procedures not recommended by Altec AIR or installing components not supplied by Altec AIR is not recommended and may void the warranty.

General Operating Information

- Do not operate the air dryer without proper training and authorization.
- Use the air dryer for intended applications only.
- Be sure the air dryer is operating properly and has been inspected, maintained, and tested in accordance with Altec AIR's and the government's requirements.
- Ensure the manual is properly stored with the air dryer.
- Follow all employer regulations and safety rules and/or any state or federal law.

Air Dryer Electrical Information

⚠ WARNING

To avoid electrical overload and shock hazard, incoming power to the air dryer must be sized according to air dryer specifications.

Air dryer specifications can be found in Section 2 under General Specifications.

Disclaimer of Liability

Altec AIR is not liable for unauthorized alterations or modifications of the air dryer. Altec AIR is not liable for improper or abusive operation of the air dryer.

Do not alter or modify the air dryer in any way that might affect its structural integrity or operational characteristics without specific written approval from Altec AIR or an equivalent entity.

Unauthorized alterations or modifications will void the warranty. However, of greater concern is the possibility that unauthorized changes could adversely affect the air dryer's operation and could endanger personnel and/or damage property. Altec AIR is not responsible for unauthorized alterations or modifications that cause death, serious injury, and/or property damage.

Altec AIR assumes no liability for any personal injury and/or property damage related to the use of this manual when performing testing, operating, maintenance, and/or repair procedures on the Altec AIR air dryer.

Section 4 — Installation

Safety and Warning Information

WARNING

Avoid contact with live electrical circuits. Many procedures performed during installation, operation, testing, and maintenance require the air dryer to be energized, creating a situation for potential electric shock. Remove all jewelry before performing procedures.

The air dryer is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning the use of the air dryer by a person responsible for their safety.

To avoid electric shock, damaged cords should be replaced by a qualified individual.

To avoid electrical overload and shock hazard, incoming power to the air dryer must be sized according to air dryer specifications.

Follow all of the information in this manual to minimize the risk of electric shock, and prevent property damage or personal injury.

CAUTION

Internal surfaces may be hot. Use care when coming into contact with internal components as there is a potential for some of these components to become hot when in operation or standby.

The air dryer produces high noise. Air dryers are intended to be installed in an unattended area. Use ear protection when in the vicinity of the dryer or exhaust ports, especially if the dryer is operating without mufflers.

Before You Begin

Upon arrival, check the air dryer and shipping box for damage. If any shipping damage is found, file a claim with the shipping company before beginning the installation procedure.

Read Section 4 — Installation in its entirety to become familiar with the components and procedures required to install the air dryer.

Review the data label and ensure proper electrical circuit to support voltage and amperage of the air dryer.

The air dryer must be installed in a well ventilated room that is free from dust, toxic gases, humidity, or pollution. Ambient temperatures must be at least 35 degrees Fahrenheit (2 degrees Celsius) and not exceed 120 degrees Fahrenheit (49 degrees Celsius).

Air dryers are designed to be installed on a concrete base capable of supporting the weight and forces from the air dryer operation. Remove the air dryer from the shipping pallet prior to installation. Larger units may require the use of material handling equipment to position the air dryer.

WARNING

Do not use the hooks on top of the drying towers to lift or maneuver the air dryer into place. This may result in injury to people near the air dryer or damage to the equipment.

Air dryers must be at installed at least 3' (1 m) away from walls and any other equipment. Clearance requirements may vary by model. Contact Altec AIR for more information about clearance requirements.

Do not run air through the air dryer without power to the air dryer on.

NOTICE

The installation of piping before delivery of the air dryer is not recommended. This could create issues with the proper fit of the inlet and outlet ports of the air dryer with the compressed air system. Altec AIR will not cover the cost of any modifications to external structures or systems to fit the dryer due to fit or tolerance issues of piping.

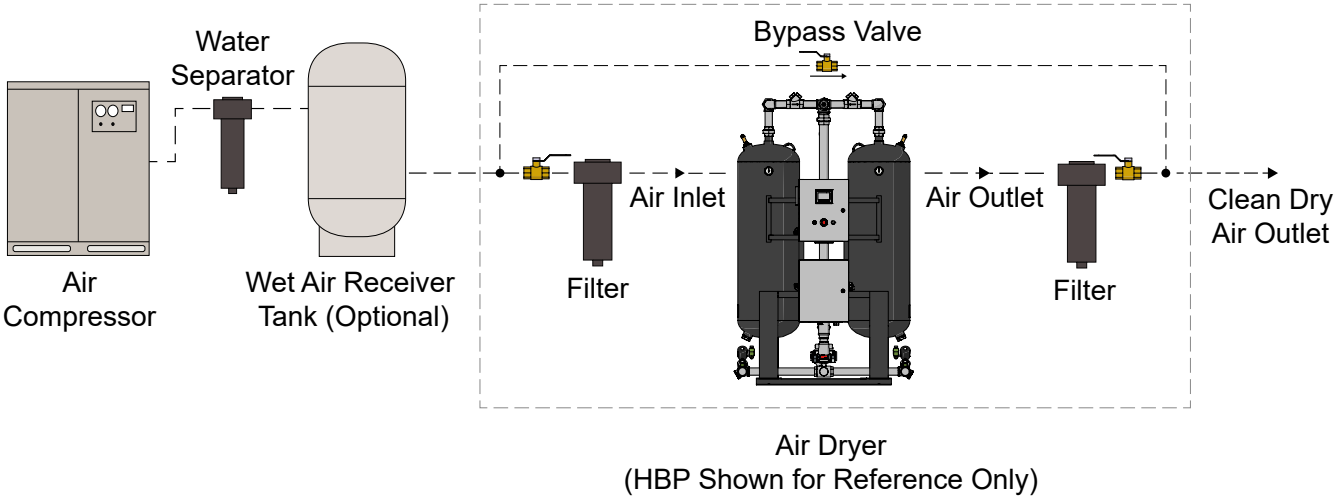
Do not mix inlet and outlet air flow. Pipe diameter should be sized according to the air flow requirement of the air dryer. Do not use the inlet and outlet of the air dryer to support the weight of the air piping.

A complete compressed air filter kit is recommended to protect the air dryer and downstream processes from contaminants found in the compressed air supply. Some models come with pre- and post-filters already installed on the air dryer. If installing your own pre-filter, install it as close to the air dryer as possible. If a post-filter is required, install before starting the air dryer. Contact your Altec AIR representative for more information.

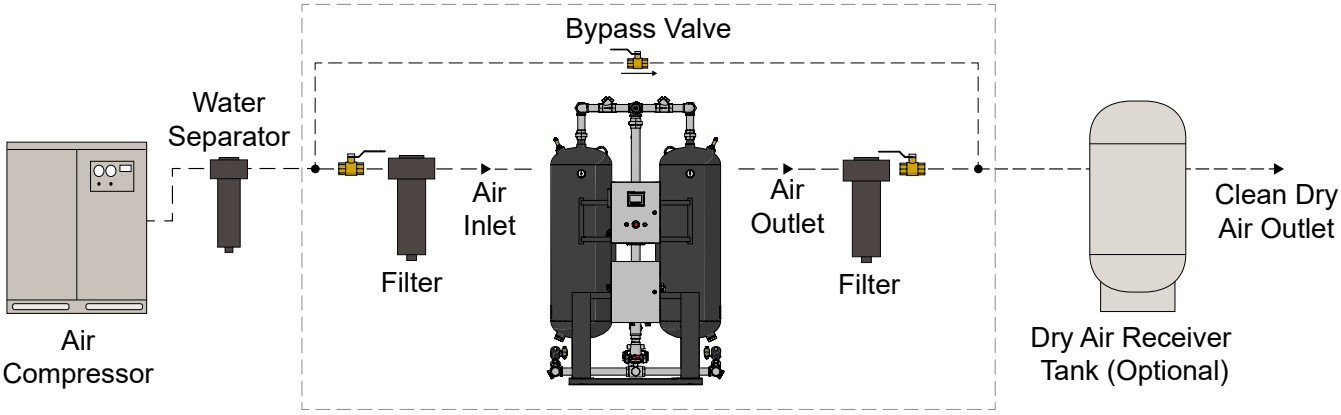
Install isolation valves at the air dryer inlet and outlet, along with a bypass valve around the dryer if one was not provided with the unit.

Installation Configurations

These diagrams are general in nature and do not represent a specific unit configuration.



Wet Air Receiver Tank Set-Up



Dry Air Receiver Tank Set-Up

NOTICE

Desiccant dryers are designed to remove water vapor only. The desiccant used in the drying process will not perform when burdened with liquid.

The location of the receiver tank, if applicable, may vary depending on system conditions and the type of compressor used. An automatic drain is required when the receiver tank is mounted upstream of the air dryer.

Consult with a licensed technician to ensure the electrical network and protection is sized properly. Ensure all fuses or breakers are correctly sized based on the data label information. The customer is responsible for providing short circuit protection for the air dryer. Refer to Wiring Diagrams in the Appendix for connection points and other information.

Items Included With the Air Dryer

- Manual
- Package of delicate components such as thermocouples and other sensors

Installation Procedure

1. Remove the air dryer from the shipping container and inspect it for damage. If any shipping damage is found, file a claim with the shipping company before continuing the installation procedure.

2. Install inlet piping, including an isolation valve (refer to Figure 4.1).

3. Install outlet piping, including an isolation valve.

4. Install an automatic drain on the pre-filter, if not installed at the factory as part of an optional package.

5. Fill each tower with the recommended type, size and quantity of desiccant (refer to Desiccant Requirements in Section 7). Split the desiccant as evenly as possible between the two towers. One tower size may be used for multiple dryer models, so do not be concerned if the towers are not full. In some cases, the desiccant may need time to settle before the required amount will fit inside the towers.

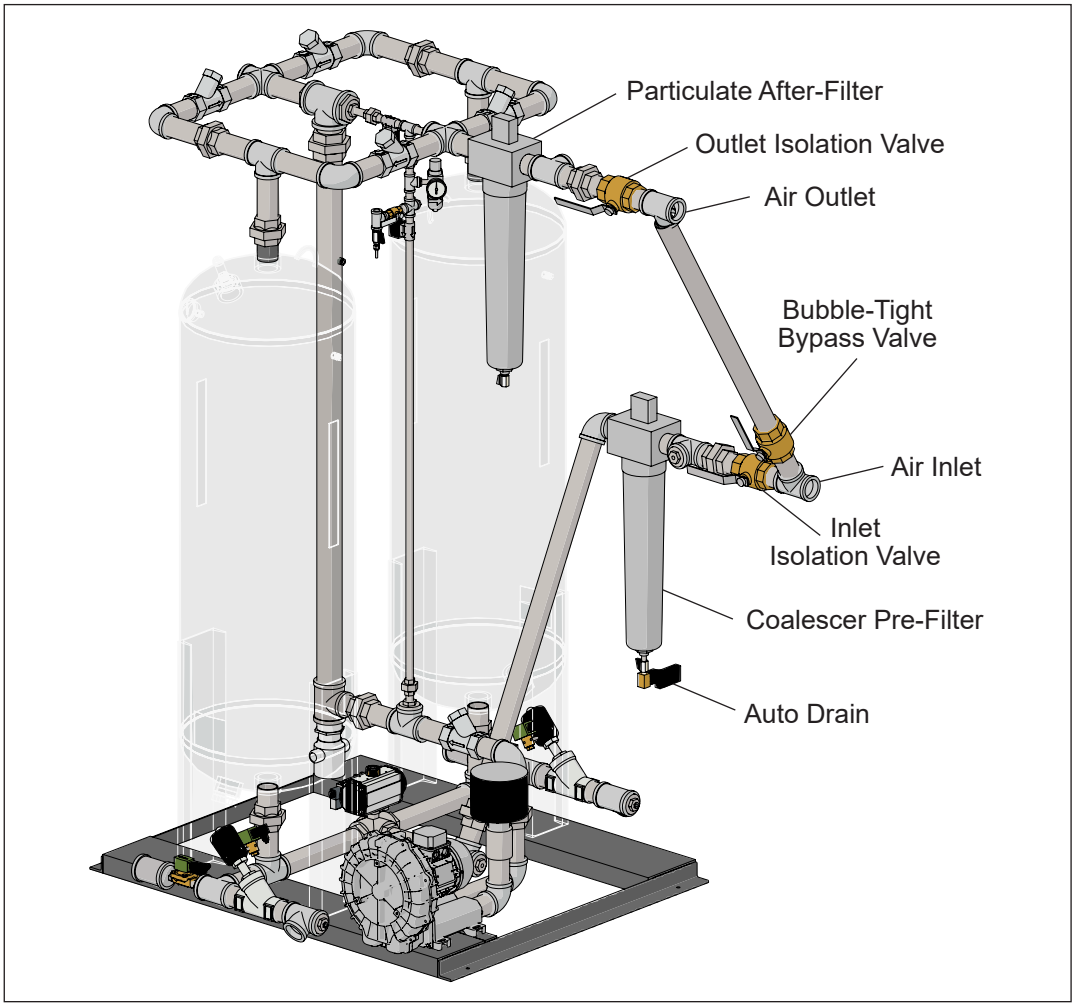


Figure 4.1 — Installed Components

6. The installation of bypass piping around the air dryer and filters is recommended, but not required, to allow for ease of servicing the equipment. Use a bubble-tight valve for the bypass.

7. Make all required electrical connections according to applicable codes and regulations.

8. Adequately support all piping, and make sure it is of at least equal size to the dryer connections.

9. Exhaust ports can be piped to a location where mufflers are not required to reduce maintenance. Exhaust ports should not be piped together. When installing exhaust piping, always up-size a minimum of one pipe size. The piping cannot under any circumstances impede regeneration air flow.

10. Check all piping and electrical connections to ensure they have maintained integrity during shipping and installation. Check tightness of manway bolts after pressurizing the air dryer.

11. Tighten wire terminations by $^{1}/_{8}$ turn to ensure tightness.

12. Register the air dryer (refer to Air Dryer Registration at the front of this manual).

Section 5 — Operation and Maintenance

WARNING

Avoid contact with live electrical circuits. Many procedures performed during installation, operation, testing, and maintenance require the air dryer to be energized, creating a situation for potential electric shock. Remove all jewelry before performing procedures.

The air dryer is not intended for use by persons with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the air dryer by a person responsible for their safety.

Children must be supervised to ensure that they do not play with the air dryer.

To avoid electric shock, damaged cords should be replaced by a qualified individual.

To avoid electrical overload and shock hazard, incoming power to the air dryer must be sized according to air dryer specifications.

CAUTION

Internal surfaces may be hot. Use care when coming into contact with internal components as there is a potential for some of these components to become hot when in operation or standby.

Desiccant exposed to oil from lack of filtration or maintenance can result in a fire or explosion due to high temperatures within the air dryer.

The air dryer produces high noise. Air dryers are intended to be installed in an unattended area. Use ear protection when in the vicinity of the dryer or exhaust ports, especially if the dryer is operating without mufflers.

Disconnect power before servicing the dryer or associated equipment.

Depressurizing the air dryer may be necessary before performing certain procedures.

Drain valves will eject water, oil, particulates, and air under partial pressure during operation.

In the event of multiple component failures, the air dryer could encounter a large air and/or pressure loss. Bypass the air dryer immediately to restore pressure and flow to the compressed air system.

NOTICE

Perform routine maintenance to ensure optimal performance over the life cycle of the air dryer. Performing procedures not recommended by Altec AIR or installing components not supplied by Altec AIR is not recommended and may void the warranty.

Refer to the safety data sheet (SDS) for instructions on handling and disposal of activated alumina and desiccant products contained within the air dryer.

It is impossible to foresee all situations and combinations for installation of the air dryer. Establish criteria for safe operation of the air dryer based on actual conditions, work procedures, and experience. The owner and operator bear ultimate responsibility for ensuring that the air dryer is properly installed.

Dryer Operational Logic

The air dryer is designed to operate with minimal input from the user, once initial setup is complete. Understanding the dryer's operational logic will help the user interpret the options available during the setup process.

The standard heat regenerative dryer cycle is made up of 16 steps. A heatless backup purge cycle is made up of 10 steps. At the end of the final step, the dryer will return to step 1 and initiate a new cycle.

Certain steps only apply to certain modes. If that mode is not active, the program ignores the step and proceeds to the next.

A manual step mode allows the user to advance through each step of the dryer cycle to verify operations.

To access manual step mode, go to the screen select menu and log in, then select cycle display. In the cycle display menu, disable timers, then use the step cycle button to manually step the dryer.

Heat Reactivated Cycle

Right Tower Drying, Left Tower Regenerating

1. *Switching towers* — Right inlet valve opens. At the end of step 1, both inlet valves should be open and both exhaust valves should be closed.

2. *Drying right tower* — Left inlet valve closes.

3. *Opening left pre-exhaust* — Left pre-exhaust valve opens. This is a small angle body valve under the tank with muffler attached. Verify the left tank relieves all pressure before moving to step 4. If the tank remains pressurized, a problem has occurred.

4. *Opening left main exhaust* — Left main exhaust valve opens. Blower prepares to start. Smaller units have only one exhaust, which opens in step 3.

5. *Heating left tower/heater cycling temperature/left exhaust temperature* — Blower turns on, then heater turns on after a time delay. Verify there is good flow through the muffler and main exhaust. Check blower amps. Verify heater temperature rises and cycles off and on according to setpoints.

6. *Blower cooldown* — Heater turns off. Blower continues to run to cool heater housing.

7. *Left tower stripping/2 percent purge active/heater and blower off* — Blower turns off and 2 percent stripping valve turns on. Verify 2 percent LED turns on and there is flow from the exhaust system.

8. *Repressurizing left tower* — Left pre-exhaust and left main exhaust valves both close. Repressurization valve opens to allow left tower to pressurize to line pressure. Verify both towers are at the same pressure. If Energy Saver Active is engaged on the main menu and the dew point is below -40 degrees (-40 degrees Celsius), the unit will delay switching towers. The user cannot manually advance past this step.

Right Tower Regenerating, Left Tower Drying

9. *Switching towers* — Left inlet valve opens. At the end of step 9, both inlet valves should be open and both exhaust valves should be closed.

10. *Drying left* — Right inlet valve closes.

11. *Opening right pre-exhaust* — Right pre-exhaust valve opens. This is a smaller angle body valve under the tank with muffler attached. Verify the right tank relieves all pressure before moving to step 12. If the tank remains pressurized, a problem has occurred.

12. *Opening right main exhaust* — Right main exhaust valve opens. Blower prepares to start. Smaller units have only one exhaust, which opens in step 11.

13. *Heating right tower/heater cycling temperature/right exhaust temperature* — Blower turns on, then heater turns on after a time delay. Verify there is good flow through the muffler and main exhaust. Check blower amps. Verify heater temperature rises and cycles off and on according to setpoints.

14. *Blower cooldown* — Heater turns off. Blower continues to run to cool heater housing.

15. *Right tower stripping/2 percent purge active/heater and blower off* — Blower turns off and 2 percent stripping valve turns on. Verify 2 percent LED turns on and there is flow from the exhaust system.

16. *Repressurizing right tower* — Right pre-exhaust and right main exhaust valves both close. Repressurization valve opens to allow right tower to pressurize to line pressure. Verify both towers are at the same pressure. If Energy Saver Active is engaged on the main menu and the dew point is below -40 degrees Fahrenheit (-40 degrees Celsius), the unit will delay switching towers. The user cannot manually advance past this step.

Heatless Backup Purge Cycle

Right Tower Drying, Left Tower Regenerating

1. Outputs null, preparing next cycle, four seconds remaining.

2. Left pre-exhaust delay, four seconds remaining.

3. Left exhaust opening, four seconds remaining.

4. Left tower regenerating, 3 minutes and 58 seconds remaining.

5. Left tower repressurizing, 50 seconds remaining, EcoTronic check after 50 seconds have elapsed (units equipped with EcoTronic dew point command control only).

Right Tower Regenerating, Left Tower Drying

6. Outputs null, preparing next cycle, four seconds remaining.

7. Right exhaust delay, four seconds remaining.

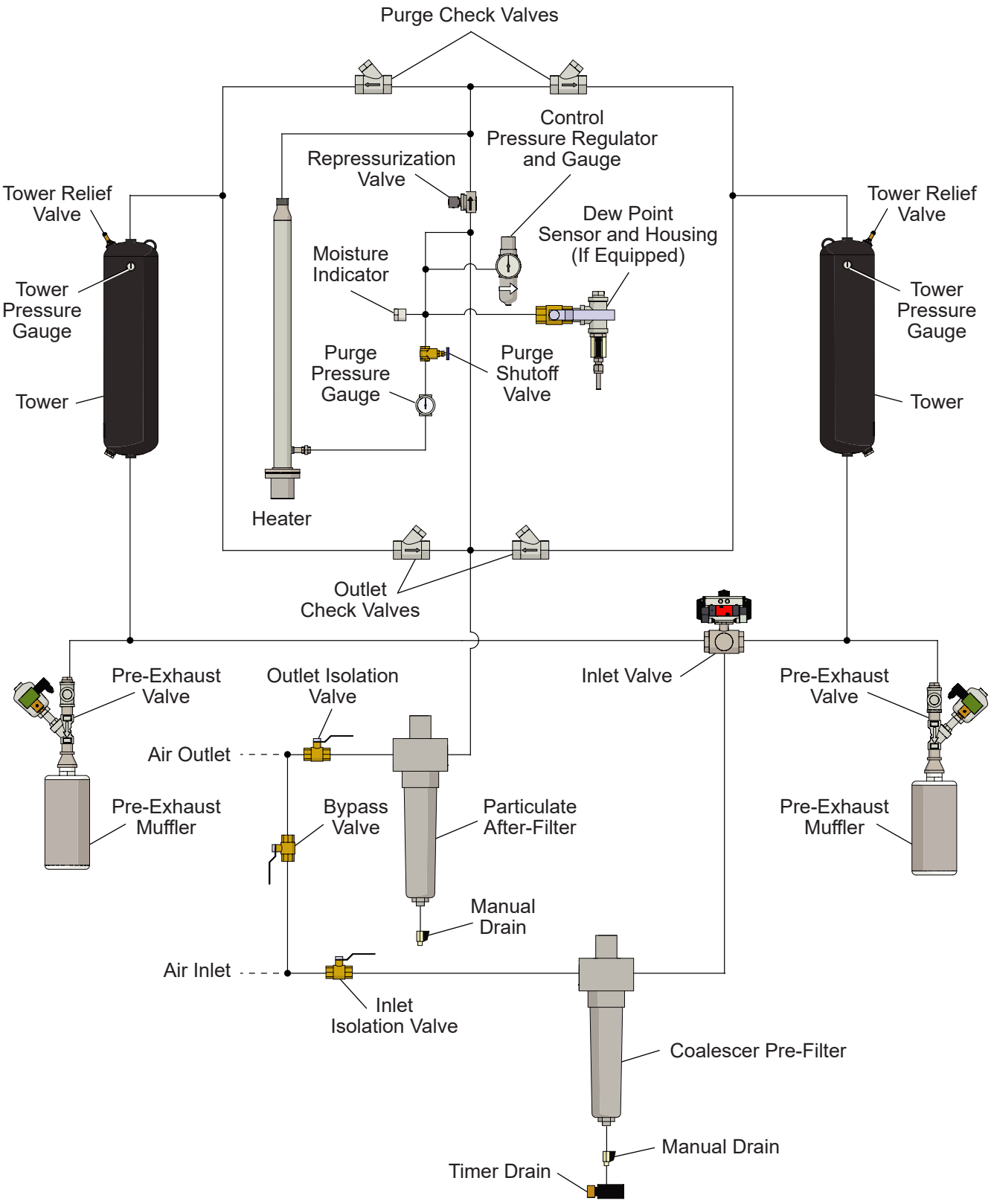
8. Right exhaust opening, four seconds remaining.

9. Right tower regenerating, 3 minutes and 58 seconds remaining.

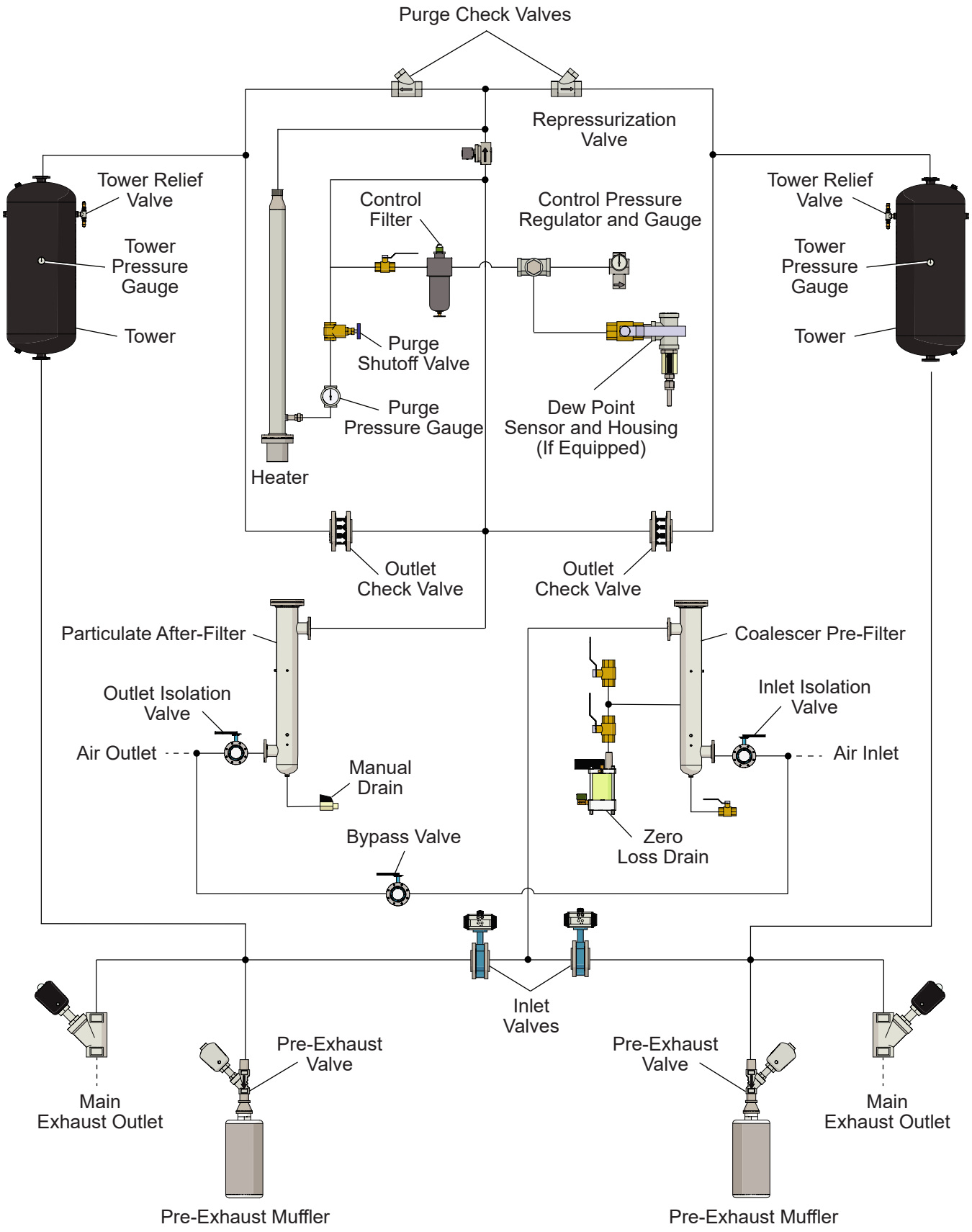
10. Right tower repressurizing, 50 seconds remaining, EcoTronic check after 50 seconds have elapsed (units equipped with EcoTronic dew point command control only).

Functional Flow Diagrams

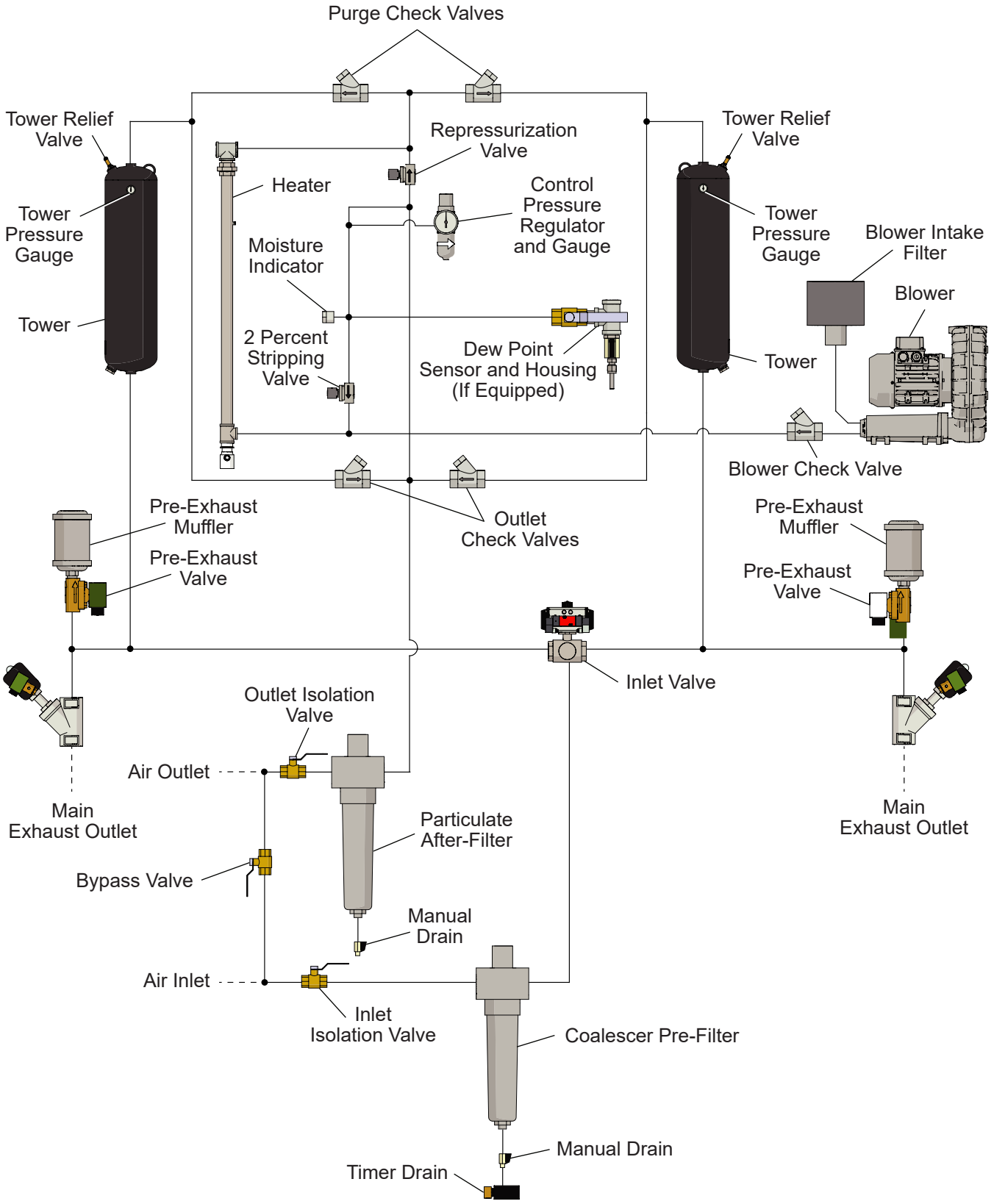
Functional flow diagrams provide detail about the flow of compressed air through the air dryer.



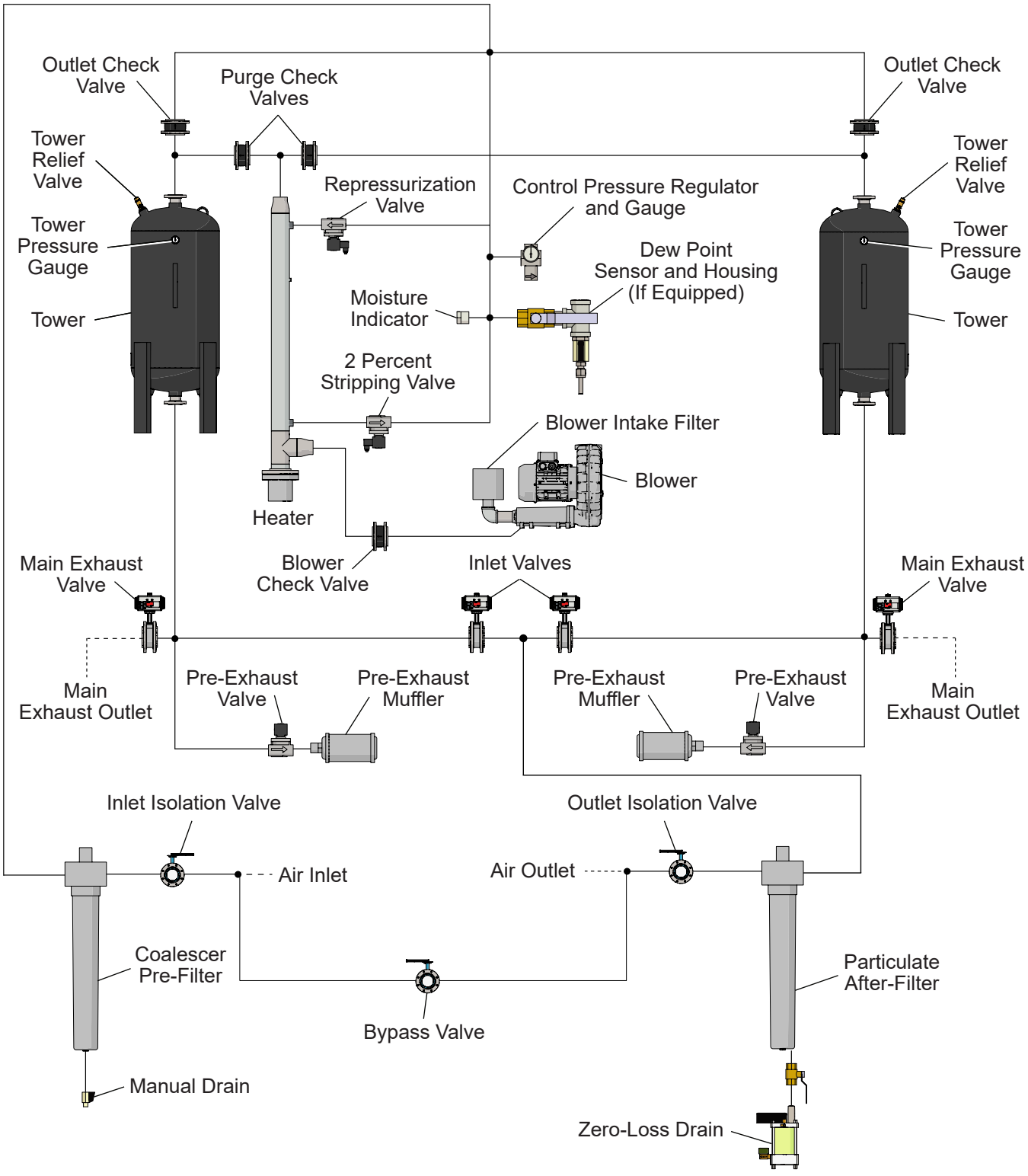
HRE-0400-4


Purge Check Valves
Repressurization Valve
Tower Relief Valve
Tower Pressure Gauge
Tower
Control Filter
Control Pressure Regulator and Gauge
Purge Shutoff Valve
Purge Pressure Gauge
Heater
Dew Point Sensor and Housing (If Equipped)
Outlet Check Valve
Outlet Check Valve
Particulate After-Filter
Outlet Isolation Valve
Air Outlet
Manual Drain
Bypass Valve
Coalescer Pre-Filter
Inlet Isolation Valve
Air Inlet
Zero Loss Drain
Inlet Valves
Pre-Exhaust Valve
Main Exhaust Outlet
Pre-Exhaust Muffler

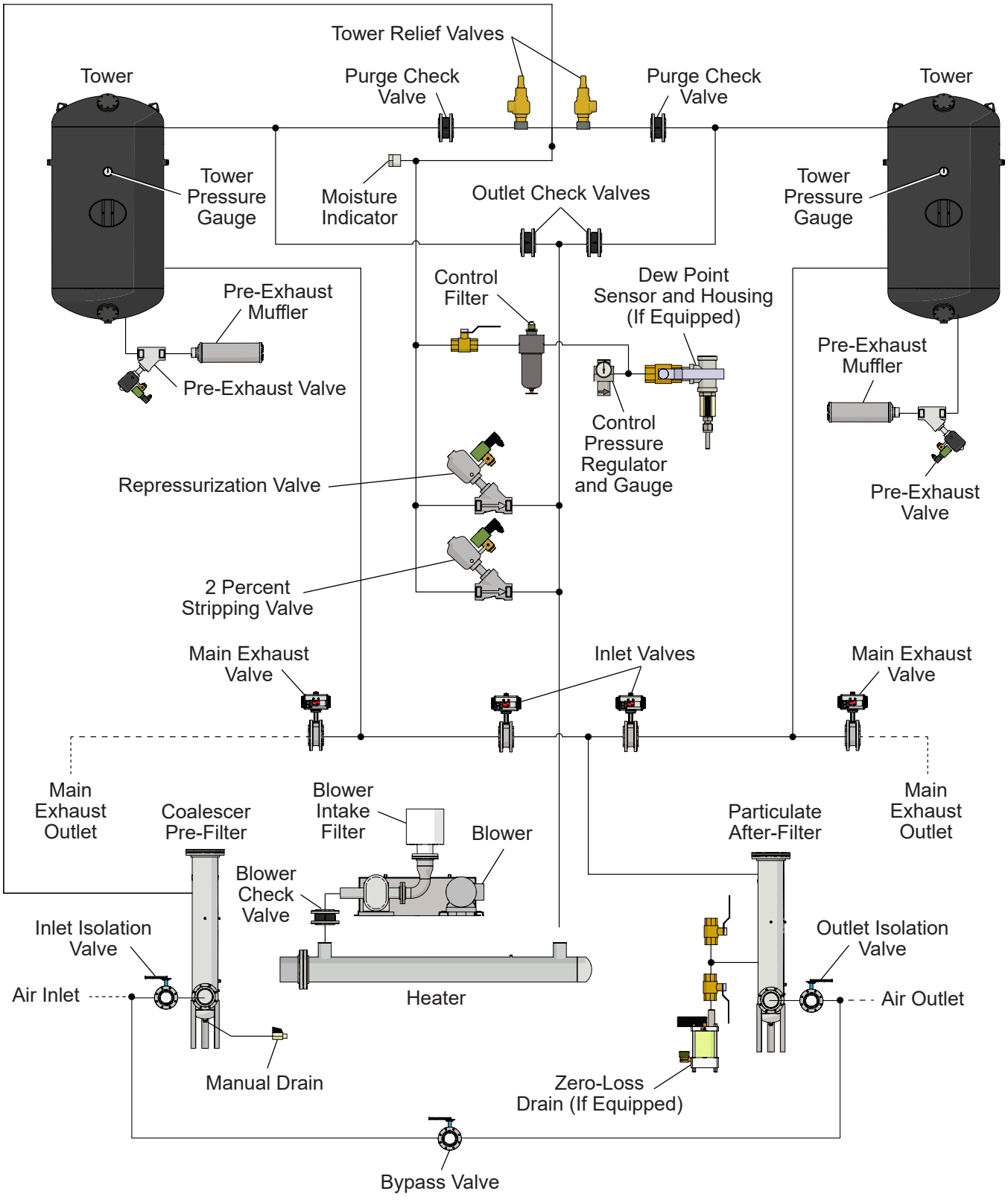
HRE-2500-4


Purge Check Valves
Tower Relief Valve
Repressurization Valve
Tower Relief Valve
Heater
Control Pressure Regulator and Gauge
Tower Pressure Gauge
Tower Pressure Gauge
Blower Intake Filter
Moisture Indicator
Blower
Tower
2 Percent Stripping Valve
Dew Point Sensor and Housing (If Equipped)
Tower
Blower Check Valve
Outlet Check Valves
Pre-Exhaust Muffler
Pre-Exhaust Valve
Pre-Exhaust Muffler
Pre-Exhaust Valve
Inlet Valve
Outlet Isolation Valve
Air Outlet
Main Exhaust Outlet
Particulate After-Filter
Main Exhaust Outlet
Bypass Valve
Manual Drain
Air Inlet
Inlet Isolation Valve
Coalescer Pre-Filter
Manual Drain
Timer Drain

HBP-550-4


Outlet Check Valve
Purge Check Valves
Outlet Check Valve
Tower Relief Valve
Tower Relief Valve
Repressurization Valve
Control Pressure Regulator and Gauge
Tower Pressure Gauge
Tower Pressure Gauge
Dew Point Sensor and Housing (If Equipped)
Moisture Indicator
Tower
Tower
2 Percent Stripping Valve
Blower Intake Filter
Blower
Heater
Main Exhaust Valve
Blower Check Valve
Inlet Valves
Main Exhaust Valve
Main Exhaust Outlet
Pre-Exhaust Valve
Pre-Exhaust Muffler
Pre-Exhaust Muffler
Pre-Exhaust Valve
Main Exhaust Outlet
Inlet Isolation Valve
Outlet Isolation Valve
Air Inlet
Air Outlet
Coalescer Pre-Filter
Particulate After-Filter
Bypass Valve
Manual Drain
Zero-Loss Drain

HBP-1500-4


Tower Relief Valves
Tower
Purge Check Valve
Purge Check Valve
Tower
Tower Pressure Gauge
Moisture Indicator
Outlet Check Valves
Tower Pressure Gauge
Control Filter
Dew Point Sensor and Housing (If Equipped)
Pre-Exhaust Muffler
Pre-Exhaust Muffler
Pre-Exhaust Valve
Control Pressure Regulator and Gauge
Repressurization Valve
Pre-Exhaust Valve
2 Percent Stripping Valve
Main Exhaust Valve
Inlet Valves
Main Exhaust Valve
Main Exhaust Outlet
Coalescer Pre-Filter
Blower Intake Filter
Blower
Particulate After-Filter
Main Exhaust Outlet
Blower Check Valve
Inlet Isolation Valve
Outlet Isolation Valve
Air Inlet
Heater
Air Outlet
Manual Drain
Zero-Loss Drain (If Equipped)
Bypass Valve

HBP-5000-5

Controller and Display Interface

The air dryers have a touch screen display that provides navigation and status updates in real time. The two main components that make this possible are a programmable logic controller (PLC) and human machine interface (HMI), shown in Figure 5.1.

The air dryer comes standard with an Allen Bradley Micro 820 PLC and an Allen Bradley PanelView 800 HMI. The HMI has a standard 4" touch screen display or an optional 7" touch screen display. Alternate PLC options are available.

The following information and screen depictions apply to all dryers that have an Allen Bradley PanelView 800 HMI, regardless of screen size or the use of an alternate PLC option. Dryers that use a different type of HMI will have a different display than what is described in this section.

The screens shown in this section are examples. Actual displays will vary by model. For example, a blower purge button will be shown on the display for HBP Series air dryers, but not HRE Series air dryers.

The mode select menu is the default start-up view for the display (refer to Figure 5.2).

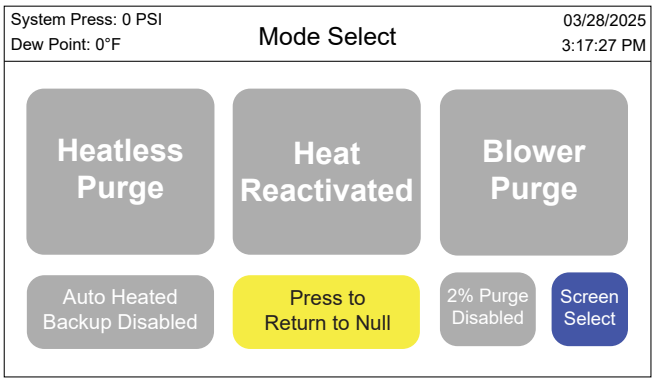


Figure 5.2 — Mode Select

The items on the screen function as described.

- *System Press* – Displays the system pressure in psi.
- *Dew Point* – Displays the dew point of the outlet air in degrees Fahrenheit (optional).
- *Date and Time* – Displays the date and time.
- *Heatless Purge* – Disables the heater and dries the desiccant in the offline tower utilizing only processed air from the online tower.
- *Heat Reactivated* – Enables the heater which allows faster drying times between cycles.

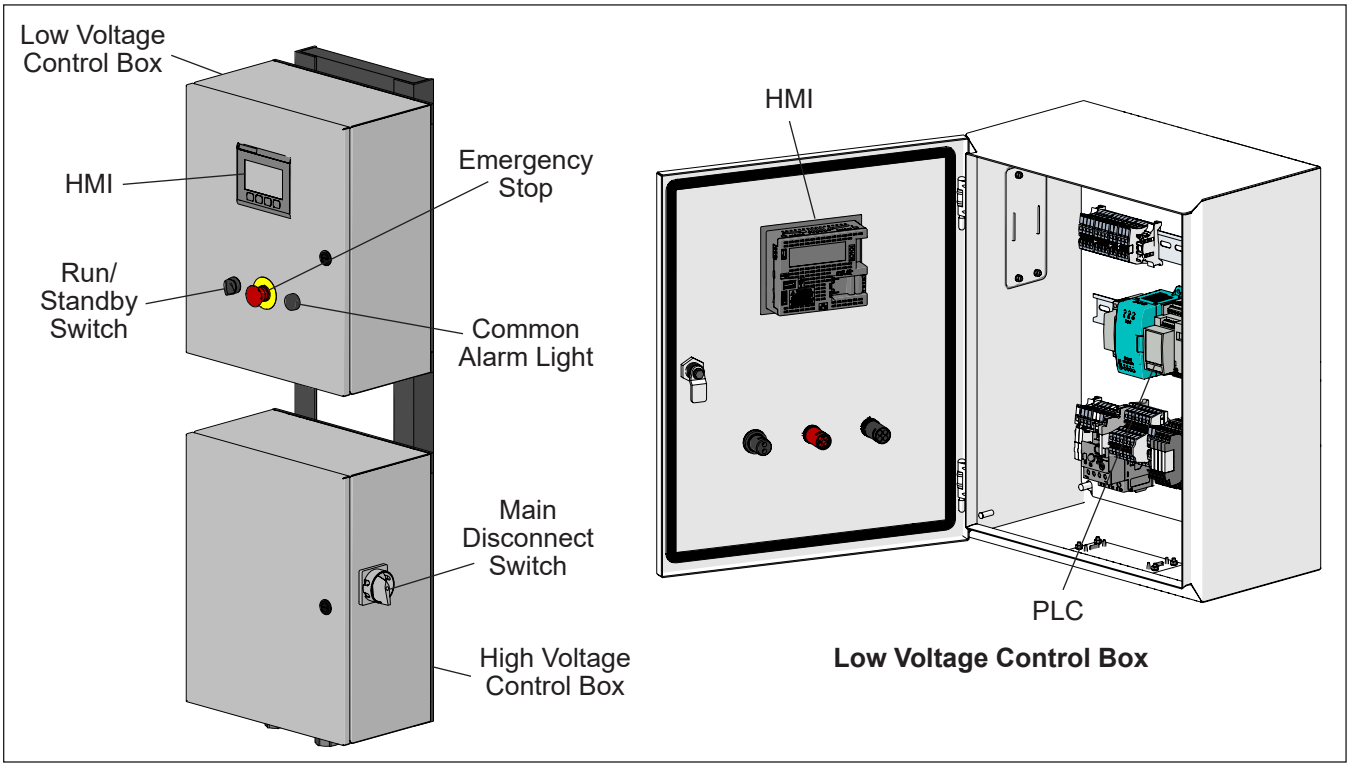


Figure 5.1 — Controller and Display Interface

- *Blower Purge* – Utilizes an external blower to dry the desiccant in the towers instead of supply air (HBP Series only).

- *Auto Heated Backup* – Utilizes heated mode as an alternative if the external blower circuit fails or is being serviced (option for HBP-0100-1 to HBP-3000-4).

- *Press to Return to Null* – Removes dryer from operating mode and puts it in new startup state. Do not press while in heated mode.

- *2% Purge* – Supplemental cool down mode that uses 2 percent of supply air for additional stripping of the heater.

- *Screen Select* – Navigates to the screen select menu.

The screen select menu provides access to several additional menus where the user can change the settings of the air dryer (refer to Figure 5.3).

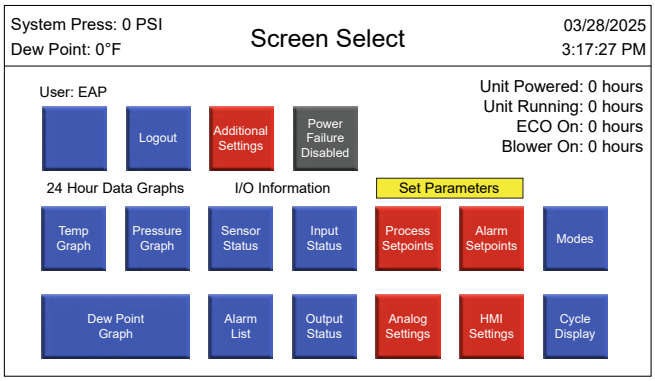


Figure 5.3 — Screen Select

The items on the screen function as described. Blue buttons are always visible. Red buttons are only visible after the user has logged into the system.

- *User* – Click the blue box below to log into the system and access advanced options. Login information is provided to distributors and service personnel by Altec AIR technical support.

- *Logout* – Log out of advanced menu options and return to the default interface.

- *Power Failure Disabled* – Changes to Power Failure Enabled when the unit has lost power.

- *Unit Powered* – Displays in hours how long the dryer has been powered on.

- *Unit Running* – Displays in hours how long the dryer has been operating.

- *ECO On* – Displays in hours how long the EcoTronic dew point demand control mode has been engaged (optional).

- *24 Hour Data Graphs* – Click the corresponding blue button below to access graphs for temperature, pressure, or dew point for the past 24 hours (refer to Figure 5.4).

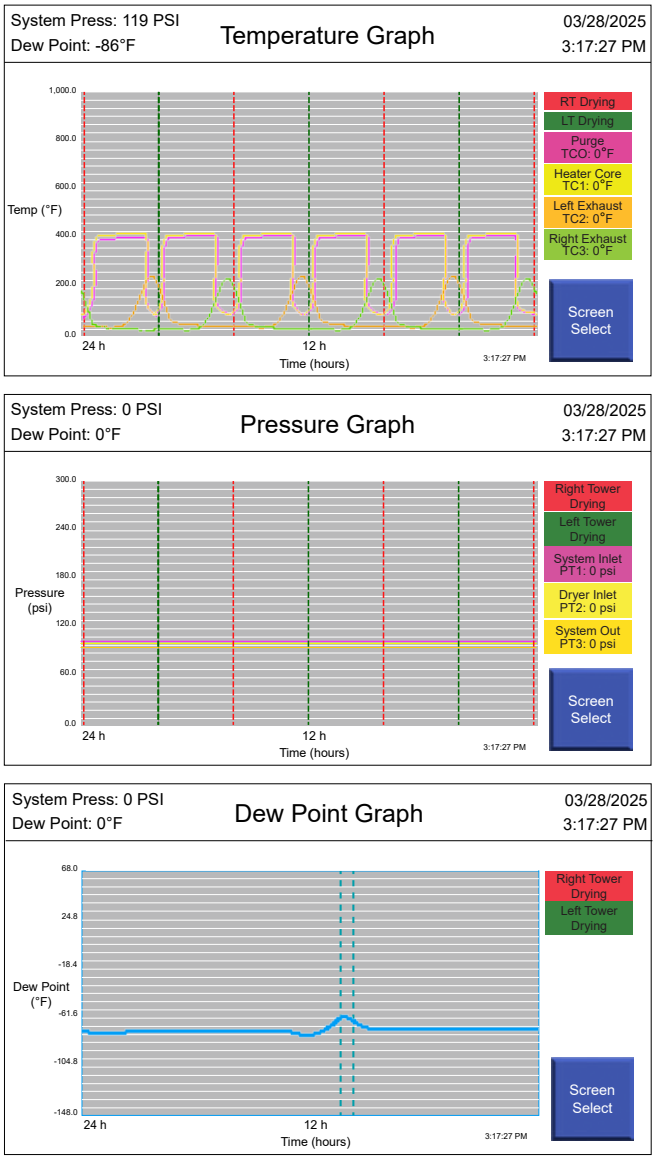


Figure 5.4 — 24 Hour Data Graphs

- *I/O Information* – Click the corresponding blue button below to display the status of sensors, alarms, inputs and outputs (refer to Figure 5.5).

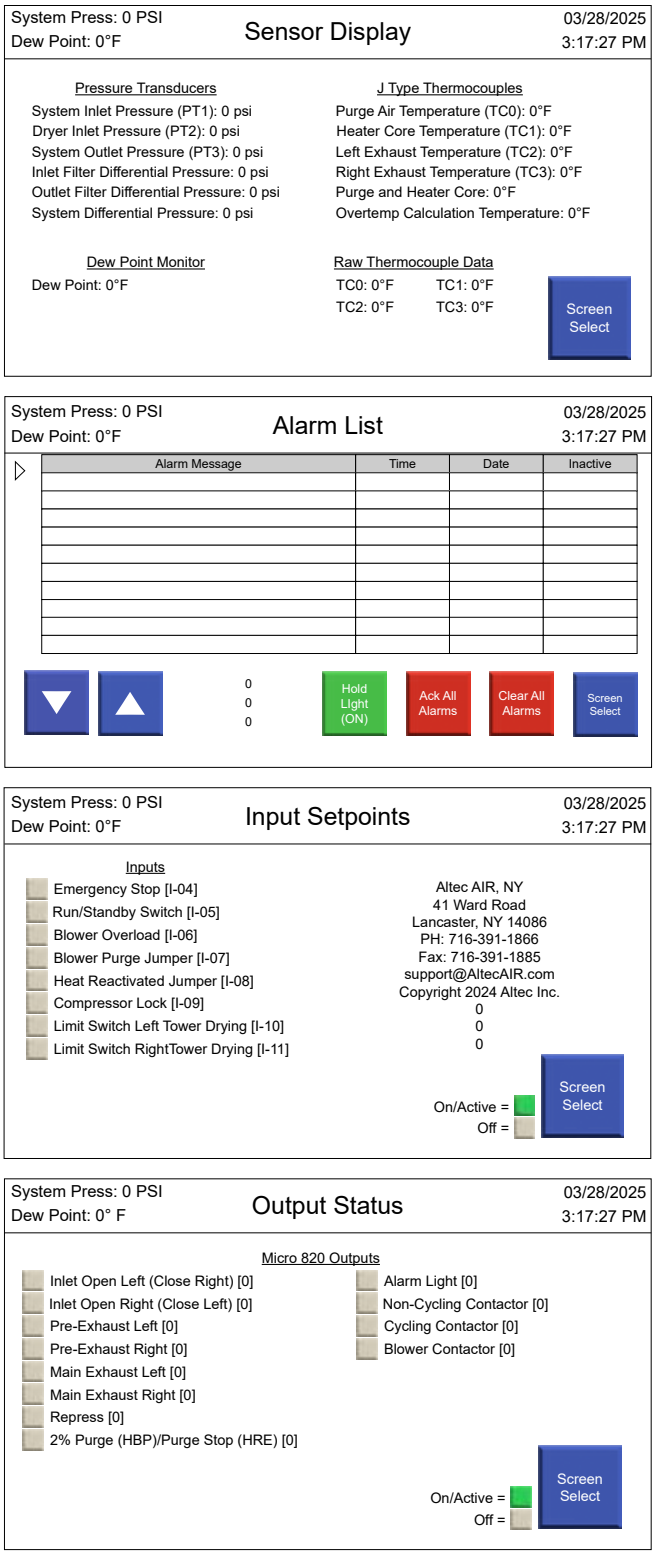


Figure 5.5 — I/O Information

- *Set Parameters* – Click corresponding red button below to access the desired setpoint and configuration menus.

— The process setpoints button provides access to the heated setpoints and heatless setpoints menus (refer to Figure 5.6), where the user can change the ranges of operation for the dryer. This menu also provides access to the bump blower function, which is used to ensure proper wiring, and that the motor is spinning in the proper direction.

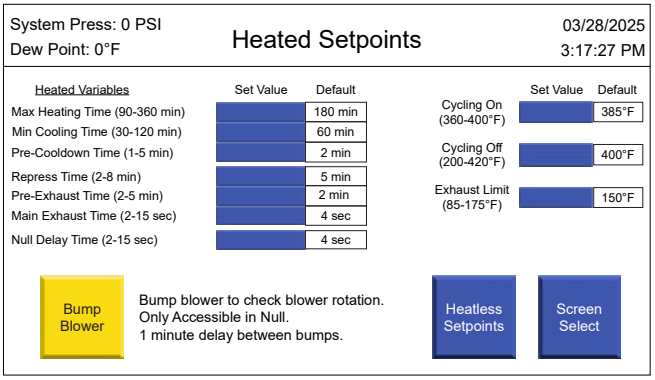


Figure 5.6 — Process Setpoints

— The alarm setpoints menu (refer to Figure 5.7) allows the user to edit setting in which the dryer will trigger alarms. Some fields have ranges to prevent the user from entering invalid settings.

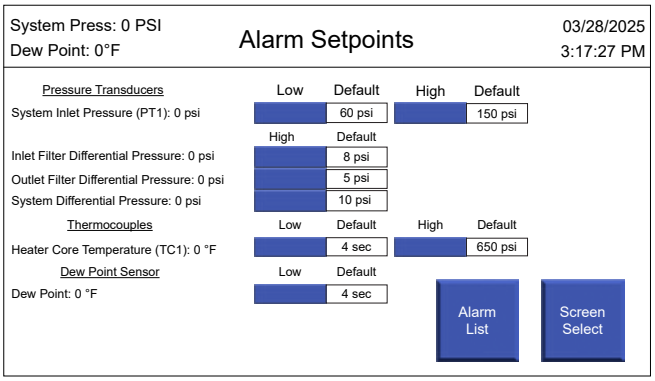


Figure 5.7 — Alarm Setpoints

— The analog settings menu (refer to Figure 5.8) allows the user to change how the controller reads sensors. This is typically left at default settings unless a user has been instructed to make changes by Altec AIR tech support.

— The HMI settings menu (refer to Figure 5.9) allows the user to access a configuration mode where they can load new programs or update system settings.

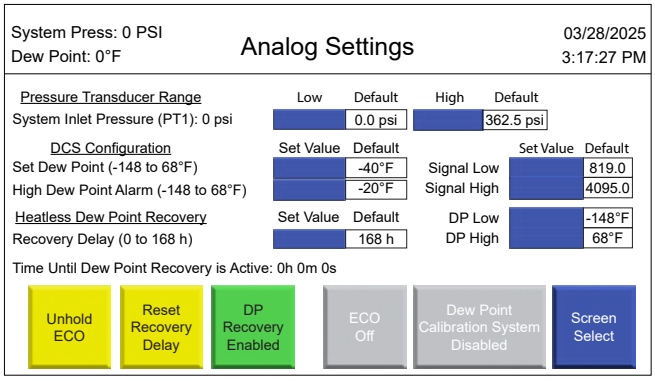


Figure 5.8 — Analog Settings

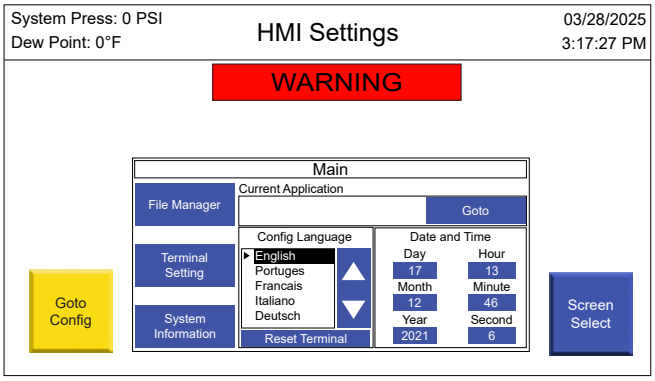


Figure 5.9 — HMI Settings

- *Cycle Display* – Displays the current mode/step of the program (refer to Figure 5.10).

  — The step cycle button allows the user to skip the current step if applicable. Some steps cannot be skipped to avoid damage to the dryer.

  — The timers enabled button indicates the dryer is using its default step timing sequence to operate. Press the button to disable the default step timing and manually advance the dryer through its sequencing (only available if logged in with advanced credentials).

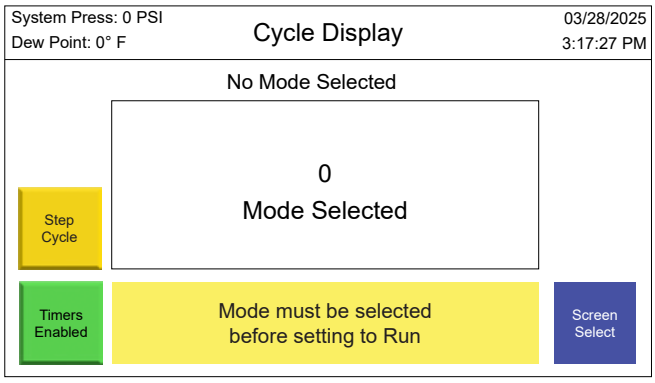


Figure 5.10 — Cycle Display

Initial Setup

Use the following procedure for the initial setup of the dryer.

1. Install and connect the dew point sensor if it was not installed at the factory. The sensor is generally shipped separately or within the low voltage controller box to prevent damage in shipping. Installation location will vary by model. Figure 5.11 shows an example of an installation location.

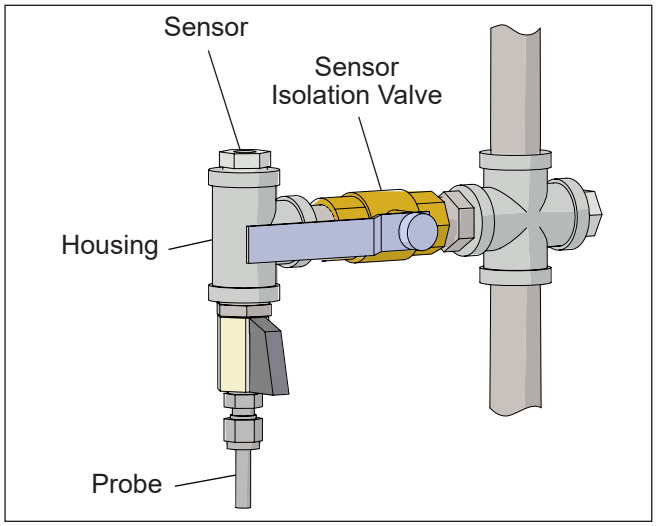


Figure 5.11 — Dew Point Sensor Installation Example

2. Remove any protective plugs or caps from solenoids and valves.

3. Install mufflers if not already installed.

4. Consult with a licensed electrician to bring power from the main electrical source to the dryer's main disconnect located within the high voltage box (refer to Figure 5.12). Incoming power must be properly grounded according to local, state, and federal codes. The terminals are labeled L1, L2, and L3. On models with a non-fused switch type of disconnect, the power connections are located directly at the disconnect instead of at the terminal blocks.

5. Turn the main disconnect switch on the high voltage box to the on position and ensure the emergency stop button is pulled out.

6. Verify electrical wiring corresponds with the wiring diagram for the exact model of dryer. If the dryer has custom components or configurations that vary from the standard diagram, contact your Altec AIR representative for additional information.

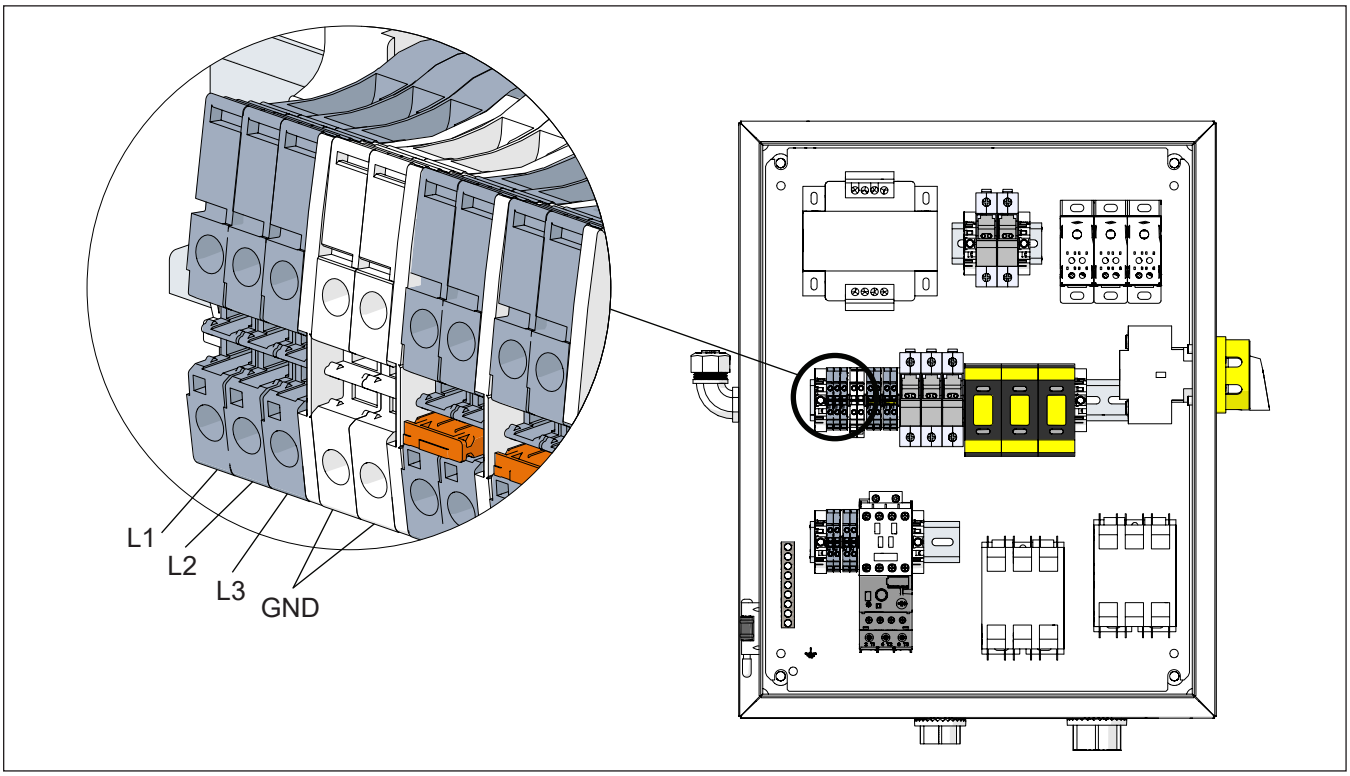


Figure 5.12 — Terminal Blocks in High Voltage Box

WARNING

Failure to properly leak test the dryer can lead to serious personal injury and damage to the equipment. Test the dryer for leaks before placing it into service.

7. Leak test the dryer with a small amount of pressurized air to ensure integrity of the system.

   a. Slowly open the inlet isolation valve (refer to Figure 5.13) until the dryer has been pressurized to 50 PSIG.

   b. Close the inlet isolation valve and check for leaks around all valves and flanges.

   c. If a leak is found, fix the leak and then test to ensure the issue has been resolved. If the issue persists, contact your Altec AIR representative.

8. After passing the 50 PSIG leak test, open the inlet isolation valve and allow the dryer to reach full operating pressure. Perform an additional check for leaks. If no leak is found, proceed to step 10.

9. If a leak is found, close the inlet isolation valve and allow the unit to depressurize, then fix the leak and repeat step 8.

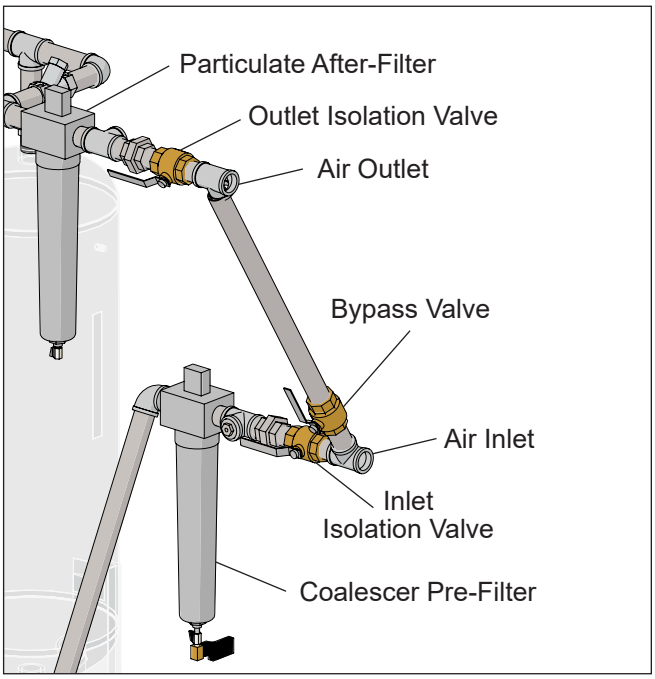


Figure 5.13 — Inlet Isolation Valve

10. If equipped with a dew point probe, open its isolation valve to allow air to flow across the sensor. It may take 24 to 48 hours for the dew point sensor to adjust to the expected reading ranges.

Starting the Dryer

The touch screen display is used to select a mode and set the parameters of the dryer. Refer to Controller and Display Interface in this section for information on the functionality of the screen.

1. From the Mode Select menu, select either Heatless Purge, Heat Reactivated, or Blower Purge.

2. On the control box, turn the run/standby switch to the run position. The chosen mode will begin to operate.

3. From the Mode Select menu, press the Screen Select button.

4. From the Screen Select menu, press the Cycle Display button. This will show the operation of the dryer at different points in its cycle. Refer to Dryer Operational Logic in this section for information on the operating cycles for different dryer modes.

5. From the Screen Select menu, press the buttons for different 24 Hour Data Graphs and I/O Information as desired to monitor the status and performance of the dryer.

6. For HRE models, verify the purge gauge pressure matches the designated setting during the purge cycle. If not, pull the regulator control out and adjust as needed by turning clockwise or counterclockwise. Push the adjustment handle back in to lock it in place.

Shutting Down the Dryer

The dryer must be shut down if it requires repair, maintenance, or the facility where it operates requires a shutdown. Use a bypass to prevent air from running through the dryer while it is out of service.

Certain emergency conditions can impact the shutdown process.

In the event of a large air pressure loss, bypass the dryer immediately.

If a regeneration circuit over temperature condition exists, do not remove power from the dryer or push the emergency stop button. Allow the dryer to cool off before taking it offline. Shutting down the dryer while it is over temperature can damage downstream equipment with hot air. Do not close the inlet isolation valve during an over temperature condition while bypassing the dryer. Leaving the inlet isolation valve open will help cool the dryer. Once the dryer is cool, the inlet isolation valve can be closed.

Use the following procedure to shut down the dryer.

1. Turn the run/standby switch to the standby position. The unit will go into a cooldown mode for 15 minutes.

2. After cooldown mode is complete, perform a cycle reset.

   a. From the Screen Select menu, press the Login button and enter username EAP (case sensitive).

   b. From the Mode Select menu, press the Press to Return to Null button.

   c. Remove power from the disconnect switch and main disconnect.

   d. Lockout/tagout (LOTO) the dryer to prevent anyone from energizing the circuit.

Changing the Dryer IP, Subnet Mask, or Gateway Address

Communication between the HMI and PLC can be configured in different protocols that affect how the IP address plays a role in the system. The default setup assumes the HMI has a serial connection to the PLC, and the PLC's ethernet port is used to communicate with the end user network. For alternate configurations, contact your Altec AIR representative.

Use the following procedure to update the desired address.

1. Insert the MicroSD card for the PLC into a computer and open the file named ConfigMeFirst.

2. Locate the line of text within the brackets that begins with IPA, SNM, or GWA (refer to Figure 5.14).

```
[FWFILE=firmware\2080-LC20-20AWB\
2080-LC20-20AWB_CD_14.011.05.nvs]
[FWDOWN=0]
[CF]
[ESFD]
[IPA=192.168.1.1]
[SNM=255.255.255.0]
[GWA=0.0.0.0]
[RSD=MICRO820]
[END]
```

Figure 5.14 — ConfigMeFirst Example

3. Enter the desired address and save the file to the MicroSD card. On some file configurations the [GWA=0.0.0.0] line of text is missing, and the PLC

assumes a gateway address of 0.0.0.0. If a different gateway address is desired, that line of code will need to be added to the text file with the desired address and saved.

NOTICE

Do not alter the ConfigMeFirst text file in other ways, as it can damage the PLC and the dryer.

4. Turn off power to the PLC and wait for the diagnostic lights to dim.
5. Insert the MicroSD card into the slot on the right rear of the PLC.
6. Reconnect power to the PLC and wait for the dryer to fully initialize.
7. Remove the MicroSD card from the PLC and power cycle it so the program can be saved and updated.

Updating HMI Firmware

Before updating the firmware for the HMI, contact your Altec AIR representative to confirm the firmware version for the specific model of dryer. Altec AIR will provide a MicroSD card or USB drive preloaded with the new firmware file.

NOTICE

If updating firmware for both the HMI and PLC, always update the HMI firmware first.

Use the following procedure to update the HMI firmware.

1. From the Screen Select menu, press the Login button and enter username EAP (case sensitive).
2. From the Mode Select menu, press the Press to Return to Null button.
3. From the Screen Select menu, press the HMI Settings button.
4. From the HMI Settings menu, press the Goto Config button, followed by the File Manager button.
5. Press the Stop Application button, followed by the Reset button.
6. Power down the dryer, either with the disconnect switch or by turning off its fuse panel breaker.
7. Insert the MicroSD card or USB drive into the appropriate slot on the HMI (side for MicroSD, back for USB).
8. Restore power to the dryer.
9. At the initial start-up screen select Yes after receiving the Allow Autorun? prompt.
10. After initial setup is complete, the Allow Autorun? prompt will appear again. Select No.
11. Enter current values for date and time (if applicable).
12. Press the File Manager button.
13. Select either USB or SD for the Source field, depending on which media is used.
14. Select Internal for the To field and press Copy.
15. After the information is copied, set the Source field to Internal and the To field to Internal.
16. If multiple versions of firmware are on the media, use the arrow keys to scroll through the available files. Use the date code formatting on the files to identify the most recent version of the firmware and select it.
17. Once the desired firmware file is selected, press the Set As Startup button.
18. Remove the MicroSD or USB, then press Run.
19. Communication errors may occur during the initial boot of the new firmware. If this occurs, press the Clear All button and proceed to selecting the desired mode of operation.

Updating PLC Firmware

Before updating the firmware for the PLC, contact your Altec AIR representative to confirm the firmware version for the specific model of dryer. Altec AIR will provide a MicroSD card preloaded with the new firmware file. If updating firmware for both the HMI and PLC, always update the HMI firmware first.

Use the following procedure to update the PLC firmware.

1. Turn off power to the PLC and wait for the diagnostic lights to dim.
2. Insert the MicroSD card into the slot on the right rear of the PLC.
3. Turn on power to the PLC. The firmware will begin to update when power is restored and the Run/Fault diagnostic lights will blink. This will take several min-

utes and the PLC must not lose power during this process or it could sustain permanent damage. Wait until the Run diagnostic light is solid green before proceeding to step 4.

4. Remove the MicroSD card and power cycle the PLC to save and update the new firmware.

Routine Maintenance

To ensure the air dryer continues to operate efficiently and reliably, inspect and maintain the following components at the specified time intervals (refer to Figure 5.15).

Use the touch screen to review readings and adjust settings as required during the routine maintenance inspection. Refer to Controller and Display Interface in this section for information on the operation of the touch screen.

The location of valves, filters, and other elements will vary based on dryer model, configuration, and individual unit setup. Become familiar with the set-up of the dryer before performing routine maintenance inspections.

WARNING

Avoid contact with live electrical circuits. Many procedures performed during installation, operation, testing, and maintenance require the air dryer to be energized, creating a situation for potential electric shock. Remove all jewelry before performing procedures.

CAUTION

Internal surfaces may be hot. Use care when coming into contact with internal components as there is a potential for some of these components to become hot when in operation or standby.

It may be necessary to depressurize the air dryer before performing certain procedures.

Inspecting and Replacing Desiccant

The dryer will not function properly if the desiccant has become burdened with liquid, contaminated with oil, or otherwise degraded in quality. Inspect a sample of desiccant from each tower every six months. Replace the

Time Frame	Maintenance Operation
Daily	Check dryer dew point readings and verify they are within range for user needs.
	Verify purge air settings.
	Verify heater temperature during regeneration/heating cycles.
	Verify pressure gauge readings match step cycles (line pressure on drying tower, 0 PSIG on regenerating tower).
Weekly	Complete all daily maintenance checks.
	Verify proper operation of dryer pre-filter.
	Clean any strainer drains and verify proper drainage.
	Verify pre-filter and after-filter elements function within accepted differential pressure range. Replace if necessary.
Six Months	Complete all daily and weekly maintenance checks.
	Inspect desiccant condition. It should be white, dry to touch, and maintain a consistent size and shape.
	Verify mufflers are clean and free flowing. Replace mufflers if they are clogged or otherwise restricted.
	Replace pre-filter and after-filter elements. This may occur sooner if elements fail a weekly inspection.
	Clean automatic drains on dryer pre-filters.
	Replace control air filter element.
Annual	Complete all daily, weekly and six month maintenance checks.
	Clean control solenoid valves.
	Inspect electrical contactors/starters. Repair or replace if necessary.

Figure 5.15 — Routine Maintenance

desiccant every 3 to 5 years, depending on operational and environmental factors, or sooner if the desiccant fails an inspection.

NOTICE

Refer to the SDS for instructions on handling and disposal of activated alumina and desiccant products contained within the air dryer.

Use the following procedure to inspect and replace the desiccant.

1. Shut down power and bypass the dryer (refer to Shutting Down the Dryer in Section 5).
2. Open the drain port at the bottom of one tower and collect less than one cup of desiccant, then close the drain port.
3. Visually check the quality of the desiccant. It should be white, dry to touch, and the individual beads should have a consistent size and shape. Repeat steps 2 and 3 for the second tower before proceeding to step 4.
4. If the desiccant passes inspection, put the dryer back into service. If the desiccant fails inspection, proceed to step 5.
5. Open the drain ports and collect all desiccant from each tower in a suitable container (refer to SDS), then close the drain ports.
6. Open the fill port at the top of each tower. Larger units have a manway, while smaller units utilize the threaded port that holds the tower relief valve.
7. Fill each tower with the recommended type, size, and quantity of desiccant (refer to Desiccant Requirements in Section 7). Split the desiccant as evenly as possible between the two towers. One tower size may be used for multiple dryer models, so do not be concerned if the towers are not full. The desiccant may need time to settle before the required amount will fit inside the towers.
8. Close the fill ports, and put the dryer back into service.
9. Properly dispose of the desiccant according to SDS and all applicable local, state, or federal regulations. Desiccant contaminated with oil or other substances may have different disposal requirements than desiccant replaced due to age.

Air Dryer Components

Each air dryer includes two towers (refer to Figure 5.16). The size and shape of the towers will vary by model, along with the amount of desiccant stored inside. Desiccant is added and removed through ports at the top and bottom of each tower. On smaller dryers, the relief valve at the top of each tower must be removed to add desiccant.

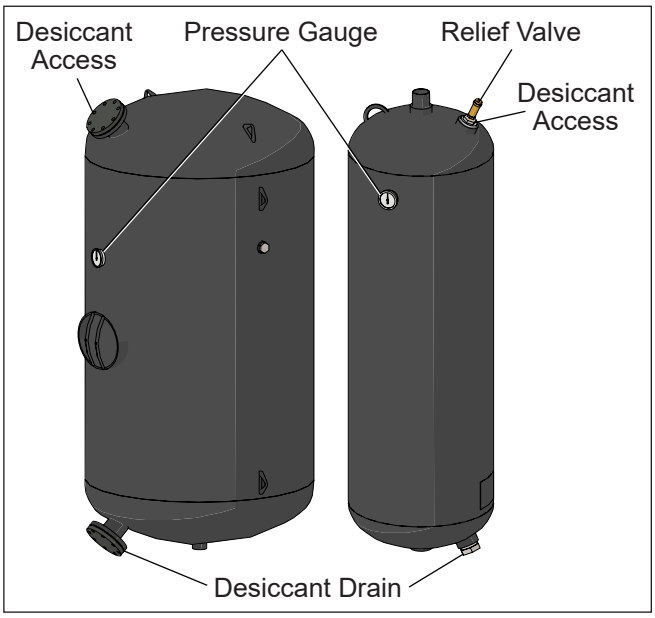


Figure 5.16 — Towers

Only one tower is online (drying) at a time, while the other is offline (regenerating). When a tower is online, compressed air saturated with water vapor flows upward through the tower, where water molecules adhere to the desiccant.

Both air dryer models use a heater to heat a regulated amount of process air and direct it down through the desiccant in the offline tower (refer to Figure 5.17).

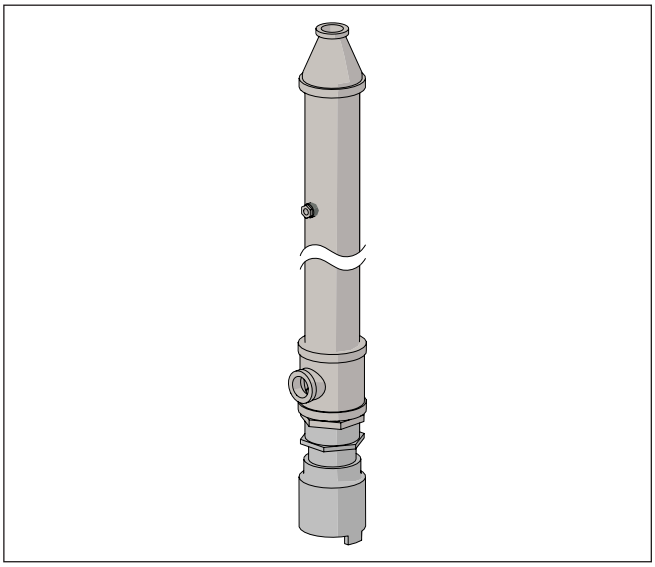


Figure 5.17 — Heater

HBP models also use an external blower to direct heated atmospheric air through the offline tower (refer to Figure 5.18).

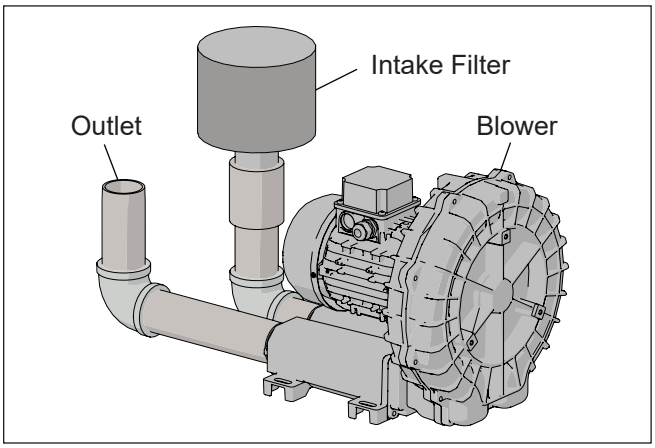


Figure 5.18 — Blower

Both processes regenerate the desiccant by removing water vapor that adhered to the desiccant during the drying cycle.

Air dryers produce high noise and are intended to be installed in an unattended area. Mufflers are used to reduce the noise level (refer to Figure 5.19).

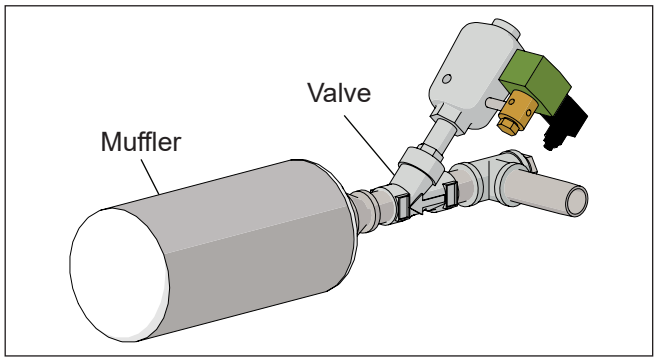


Figure 5.19 — Pre-Exhaust Muffler

The dryer has two mufflers, but only one operates at a time, depending on which tower is online and which is offline. A solenoid opens and closes the angle valve body that controls whether or not air is allowed out of the exhaust. At some stages in the drying cycle, both exhaust ports will be closed.

Section 6 — Troubleshooting

Before Calling Altec AIR

Read this section to diagnose and attempt to fix the problem with the air dryer before placing a call to Altec AIR Technical Support.

This information is intended to simplify the isolation of problems, present possible causes, provide test procedures for verification, and suggest corrective action to restore the air dryer to normal operation. Each section begins with the most likely cause(s) of the issue. Otherwise, start from the simplest possibilities and progress to more complicated ones.

This information is designed to be easy to follow and is effective when used properly. Start at the beginning of the specific problem section and continue in sequence, following the procedures indicated.

Troubleshooting Procedure

Establish a troubleshooting procedure to be followed any time there is a malfunction. This procedure will provide a starting point for determining the root cause of the malfunction and increase troubleshooting accuracy. Consider using the following procedure.

1. Use the Functional Flow Diagrams in Section 5 and the Wiring Line Diagrams in the Appendix to determine the flow path required to operate the failed function. Make a list of the components used to operate the failed function. Cross off components used to operate other functions that are operating properly. This should minimize the number of items to check.

2. Check the easiest component first. Verify the proper operation of each component remaining on the list until the bad component is found.

3. Use accurate test equipment to verify temperature, flow, pressure, voltage, and current.

Once the symptom has been positively identified, use the Troubleshooting Chart in the Appendix for suggested causes and corrective actions.

⚠ WARNING

Follow all of the information in this manual to minimize the risk of electric shock, and prevent property damage or personal injury.

Internal surfaces may be hot. Use care when coming into contact with internal components as there is a potential for some of these components to become hot when in operation or standby.

Avoid contact with live electrical circuits. Many procedures performed during installation, operation, testing, and maintenance require the air dryer to be energized, creating a situation for potential electric shock. Remove all jewelry before performing procedures.

⚠ CAUTION

It may be necessary to depressurize the air dryer before performing certain procedures.

NOTICE

Perform routine maintenance to ensure optimal performance over the life cycle of the air dryer. Performing procedures not recommended by Altec AIR or installing components not supplied by Altec AIR is not recommended and may void the warranty.

Error Codes and Warnings

Error codes and warnings alert the user when the dryer is not functioning properly. Use the touch screen to access the alarm list from the Screen Select menu. Refer to Controller and Display Interface in Section 5 for information on the operation of the touch screen.

HMI faults correspond with a specific alarm, warning, or maintenance issue, each of which may require multiple checks and corrective actions. Refer to the Troubleshooting Chart in the Appendix for more information on troubleshooting the dryer.

Contacting Altec AIR Technical Support

If additional assistance is needed to correct a problem, contact Altec AIR Technical Support at (800) 521-5351 (option 1).

You will need the model number and serial number, which can be found on the data label.

If you are following-up on a previous call, have the ticket number available.

Section 7 — Parts

Introduction

Altec AIR provides parts to replace the individual components of the air dryer. The parts listed in this section apply to standard models. Specific parts may vary based on unit customization. Contact your Altec AIR representative and provide them with the dryer's serial number to confirm which parts are needed.

Instructions for the replacement of individual components are not included in this manual. Refer to the information provided with the part(s) for instructions on how to replace the components.

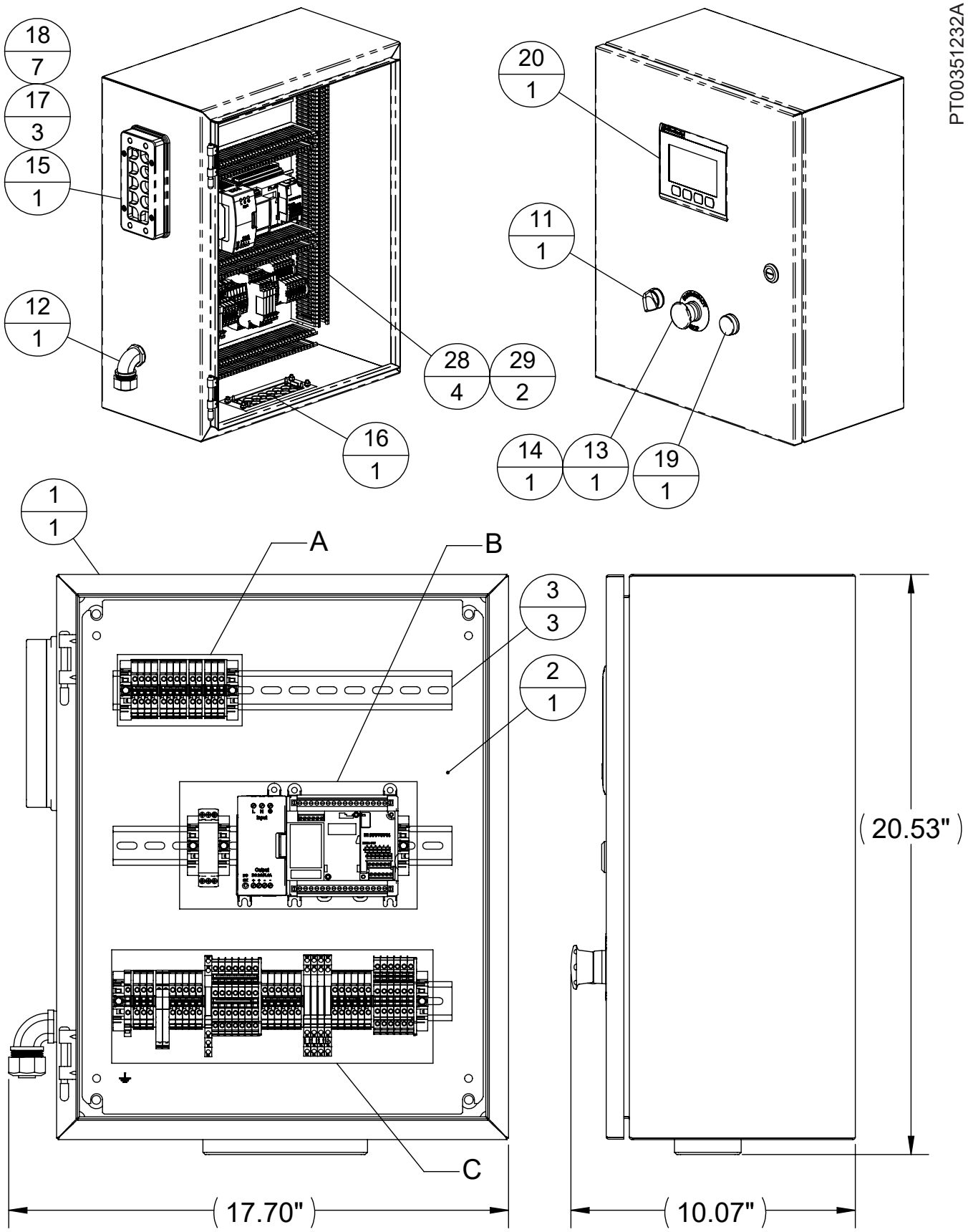
Standard HRE/HBP Air Dryers

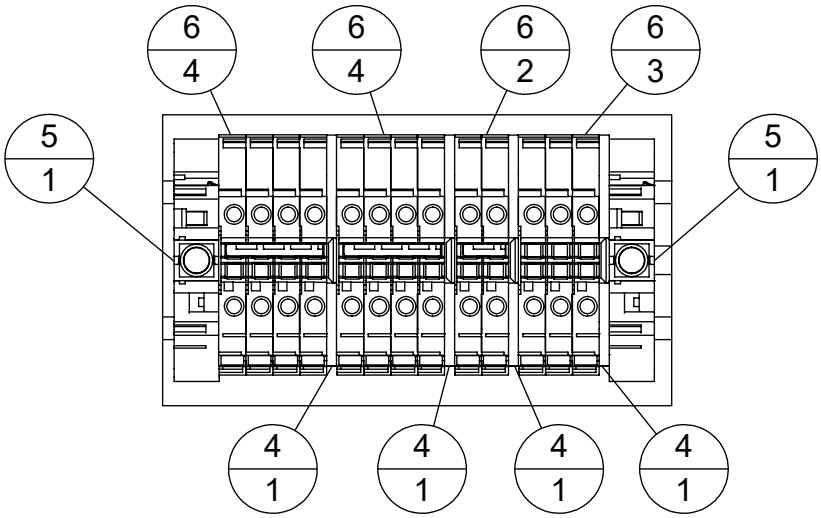
Description	Part Number	Quantity	Model	Size
Desiccant	EA3001	1 pound	HRE/HBP	Refer to Desiccant Requirements
Tower moisture indicators	MI-100	1	HRE/HBP	All
PLC controller	AB820-PLC	1	HRE/HBP	All
LCD display for PLC controller	AB820-LCD	1	HRE/HBP	All
Pressure transducer	100549910	3	HRE/HBP	All
Thermocouple	EA2086	4	HRE/HBP	All
Dew point sensor (optional)	DPM-02-P	1	HRE/HBP	All
Control solenoid	EA8101-DC	Varies by model	HRE/HBP	All
Safety relief valve	Contact Support	2 or 4	HRE/HBP	All
Re-pressurization solenoid	Contact Support	1	HRE/HBP	All
Exhaust valve	Contact Support	2 or 4	HRE/HBP	All
Outlet check valve	Contact Support	2	HRE/HBP	All
Purge check valve	Contact Support	2	HRE/HBP	All
Three-way inlet valve	Contact Support	1	HRE/HBP	All
Pre-filter drain	ELEC26-C	1	HRE/HBP	100 to 800 SCFM
Pre-filter drain	EELD-250	1	HRE/HBP	1,000 to 3,000 SCFM
Pre-filter drain	EA11-T	1	HRE/HBP	4,000+ SCFM
Coalescer filter element	Contact Support	1	HRE/HBP	All
Particulate filter element	Contact Support	1	HRE/HBP	All
Exhaust muffler	Contact Support	2	HRE/HBP	All
Purge regulating valve	Contact Support	1	HRE	All
Purge blower (HBP)	Contact Support	1	HBP	All
Heater	Contact Support	1	HRE/HBP	All
Low voltage box	100549967	1	HRE/HBP	100 to 3,000 SCFM
Low voltage box	100520933	1	HRE/HBP	4,000+ SCFM
High voltage box	100521450	1	HRE/HBP	200 to 2,000 SCFM

Desiccant Requirements

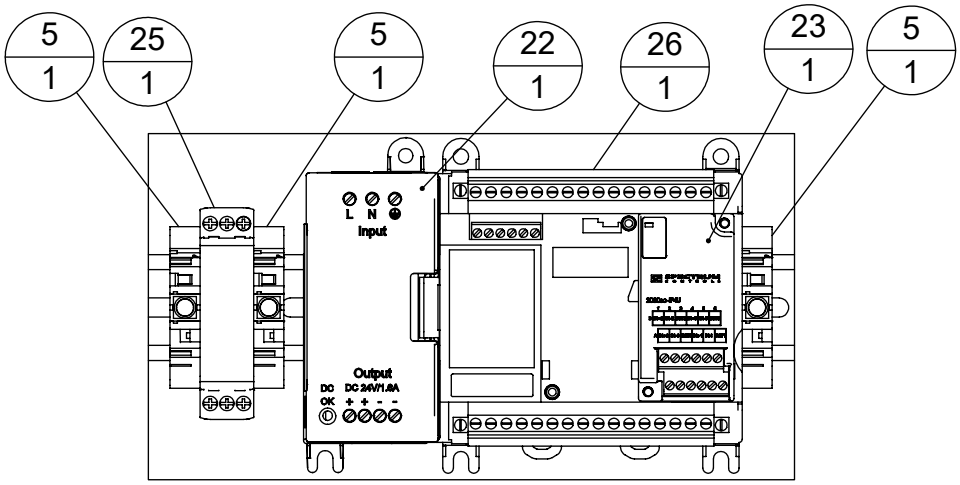
Model	Dryer Total (Pounds)	Model	Dryer Total (Pounds)
HRE-0100	140	HBP-0100	150
HRE-0130	200	HBP-0130	200
HRE-0200	280	HBP-0200	300
HRE-0250	350	HBP-0250	350
HRE-0300	420	HBP-0300	450
HRE-0400	550	HBP-0400	600
HRE-0550	775	HBP-0550	800
HRE-0650	980	HBP-0650	950
HRE-0800	1,120	HBP-0800	1,200
HRE-1000	1,400	HBP-1000	1,450
HRE-1250	1,750	HBP-1250	1,800
HRE-1500	2,200	HBP-1500	2,100
HRE-2000	2,800	HBP-2000	2,800
HRE-2500	3,650	HBP-2500	3,700
HRE-3000	4,200	HBP-3000	4,500
HRE-4000	5,700	HBP-4000	6,000
HRE-5000	7,000	HBP-5000	7,500
HRE-6000	9,000	HBP-6000	9,000
HRE-7500	12,000	HBP-7500	12,000

Low Voltage Controls

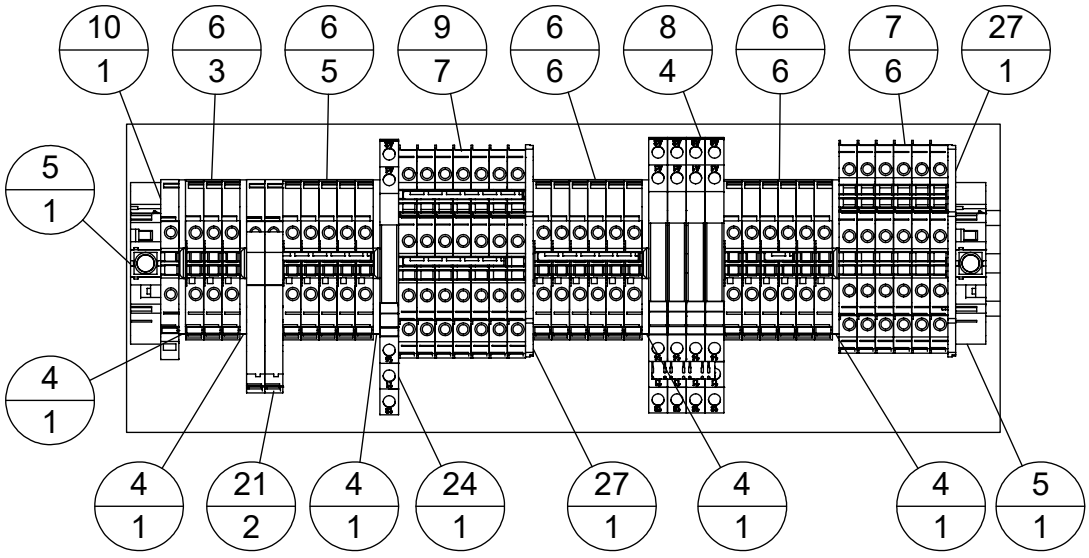




DETAIL A - TOP RAIL



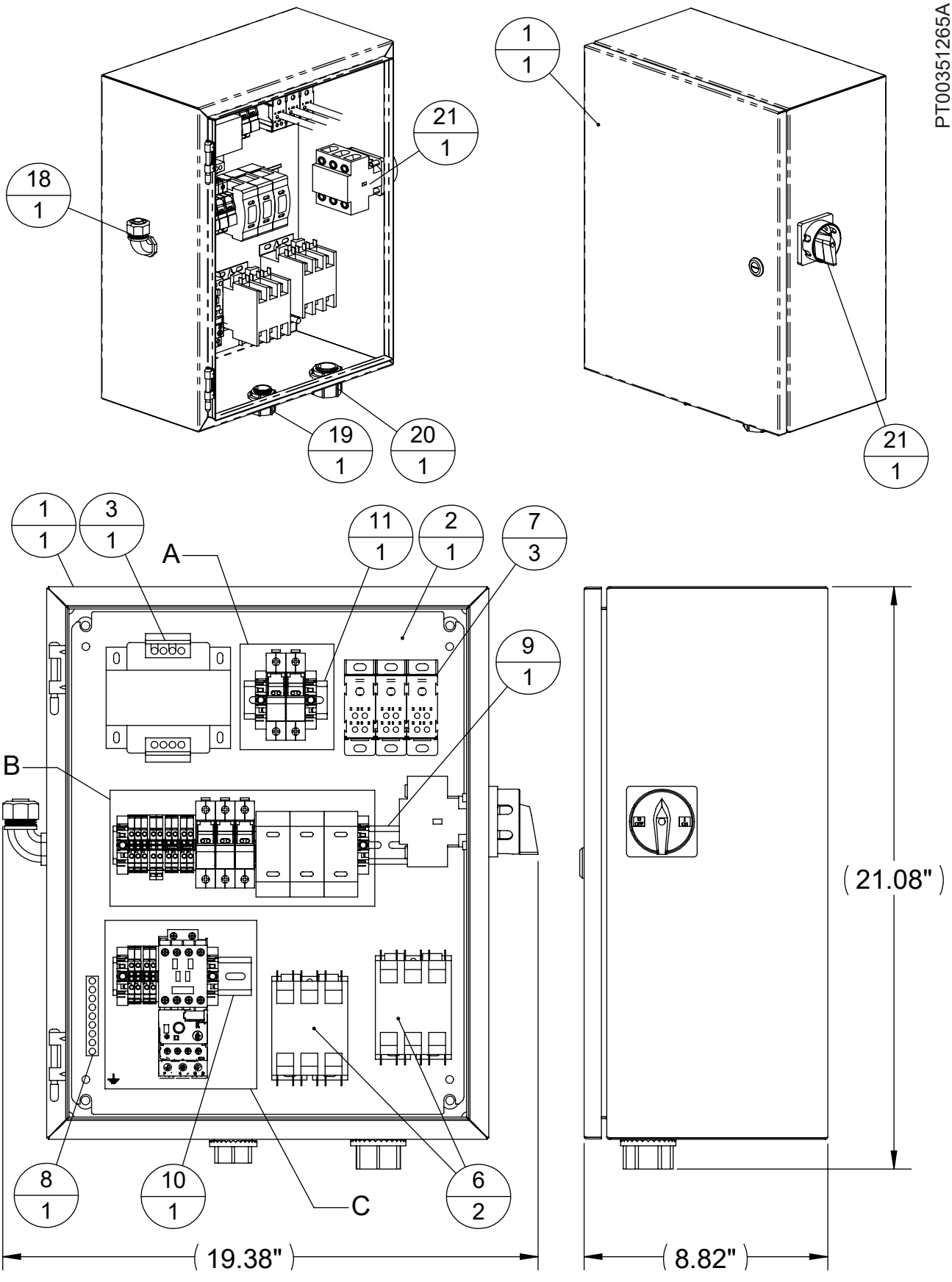
DETAIL B - MIDDLE RAIL



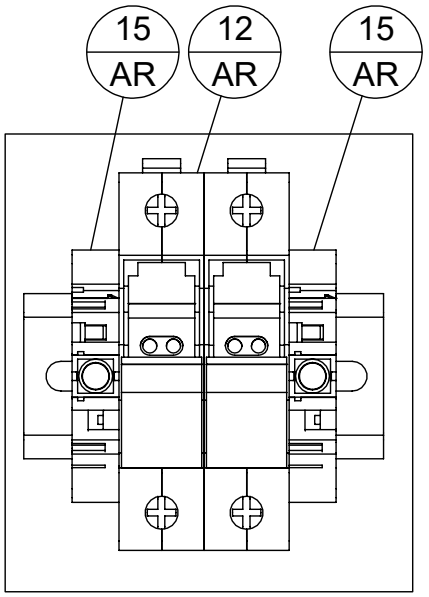
DETAIL C - BOTTOM RAIL

ITEM NO.	QTY.	PART NO.	DESCRIPTION
		100549967	
1	1	100546341	ENCLOSURE 20 X 16 X 8, NEMA 4 WITH MET LAT
2	1	100546346	ENCLOSURE, INNER PANEL, STEEL, 16 IN X 20 IN BOX, WHITE
3	3	100546481	35MM DIN RAIL (12.00 IN L)
4	9	100546594	TERMINAL END BLOCK, END CAP
5	7	100546709	TERMINAL BLOCK, END STOP
6	33	100546483	TERMINAL BLOCK - 10-24 GA ZS10
7	6	100521057	DOUBLE GROUND BLOCK
8	4	100546404	120V SPDT RELAY SLIM
9	7	100546484	TERMINAL BLOCK - DOUBLE TERMINAL
10	1	100546710	GROUND BLOCK
11	1	100546619	2 POSITION SELECTOR SWITCH
12	1	100546652	1/2", 90 DEGREE LIQUID TIGHT CONDUIT
13	1	100546336	40 MM EMERGENCY STOP (TWIST-TO-RELEASE)
14	1	100546347	EMERGENCY STOP LEGEND PLATE
15	1	100549878	CABLE ENTRY SYSTEM, FRAME, 24 MM
16	1	100549877	CABLE ENTRY SYSTEM, FRAME, 24 MM
17	3	100549879	CABLE ENTRY SYSTEM, GROMMET, SMALL
18	7	100549881	CABLE ENTRY SYSTEM, GROMMET, SMALL, BLANK
19	1	100546365	LED (RED) ALARM FOR DOOR MOUNT
20	1	100543073	PANELVIEW, 4.3 IN HMI TERM
21	2	100546714	5 X 20 MM, 3 AMP FUSE/HOLDER
22	1	100543069	POWER SUPPLY 120/240VAC-24 VDC
23	1	100543080	THERMOCOUPLE PLUG IN-SPECTRUM
24	1	100546406	12V SPDT RELAY SLIM
25	1	100546359	TIME DELAY RELAY, SPDT 120VAC
26	1	100543077	CONTROLLER
27	2	100546597	TERMINAL END BLOCK, END CAP
28	4	100546393	WIRE DUCT 1" X 2 1/4" 6' 6", GRAY (12 IN L)
29	2	100546393	WIRE DUCT 1" X 2 1/4" 6' 6", GRAY (16 IN L)
			ITEMS NOT SHOWN
30	2	100546352	JUMPERS (FOUR)
31	3	100546352	JUMPERS (SIX)
32	1	100546352	JUMPERS (SEVEN)
33	2	100546352	JUMPERS (TWO)
34	1	100546407	16-POLE BLK JUMPER
35	60	100546450	RED 18 AWG 8 MM FERRULES
36	1	100543078	9-PIN SUB D/DISPLAY
37	3	100549910	SENSOR, PRESSURE, ANALOG, 0-25, BAR, 0-10V OUTPUT
38	4	100543805	THERM. PROBE, MINERAL INSULAT
39	1	100549322	NEMA 4, LIQUID TIGHT GASKET

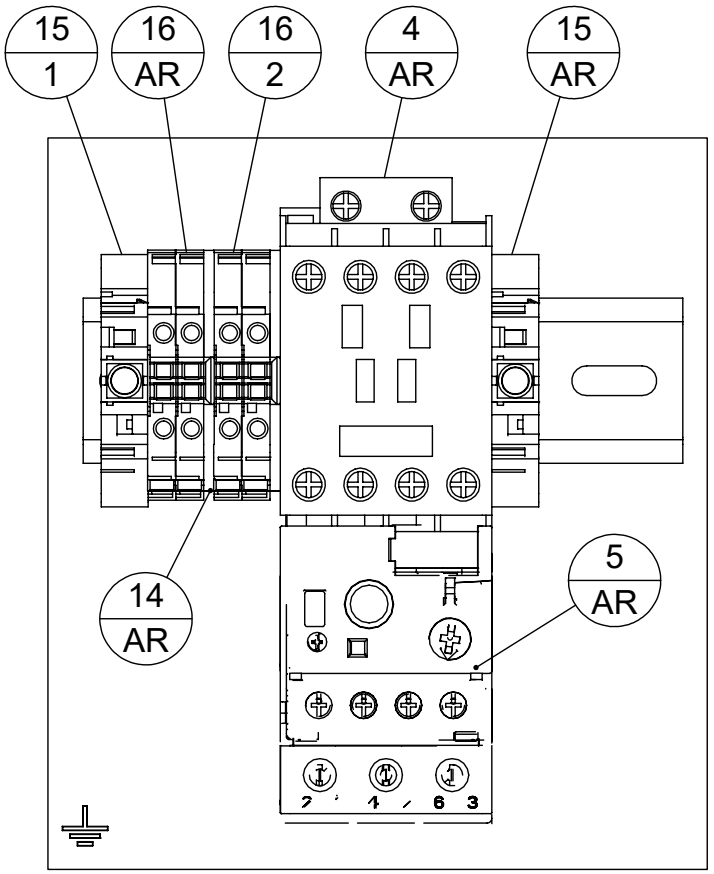
High Voltage Controls



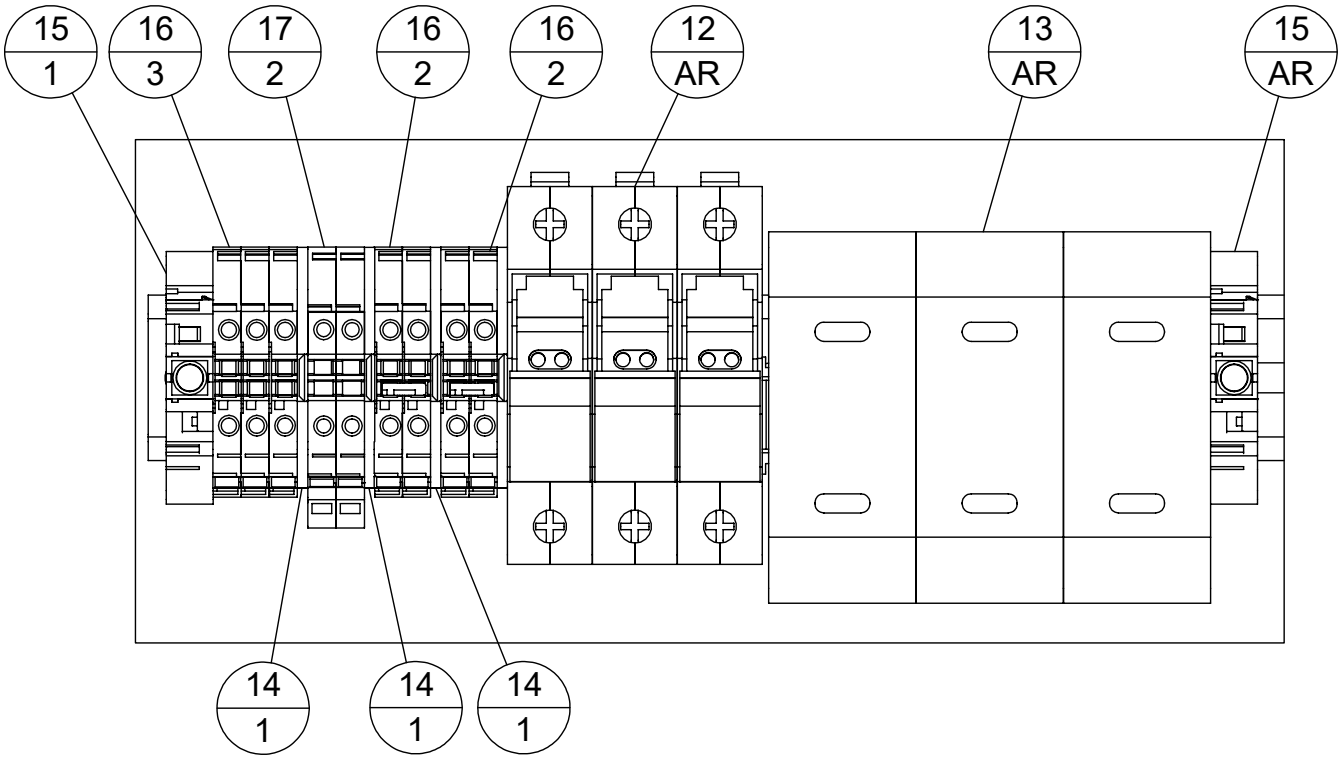
NOTE:
QUANTITIES FOR ITEMS DESIGNATED AS 'AS REQUIRED' (AR) WILL VARY BASED ON THE HEATER SIZE AND SPECIFIC HEATER REQUIREMENTS.



DETAIL A - TOP RAIL



DETAIL C - BOTTOM RAIL

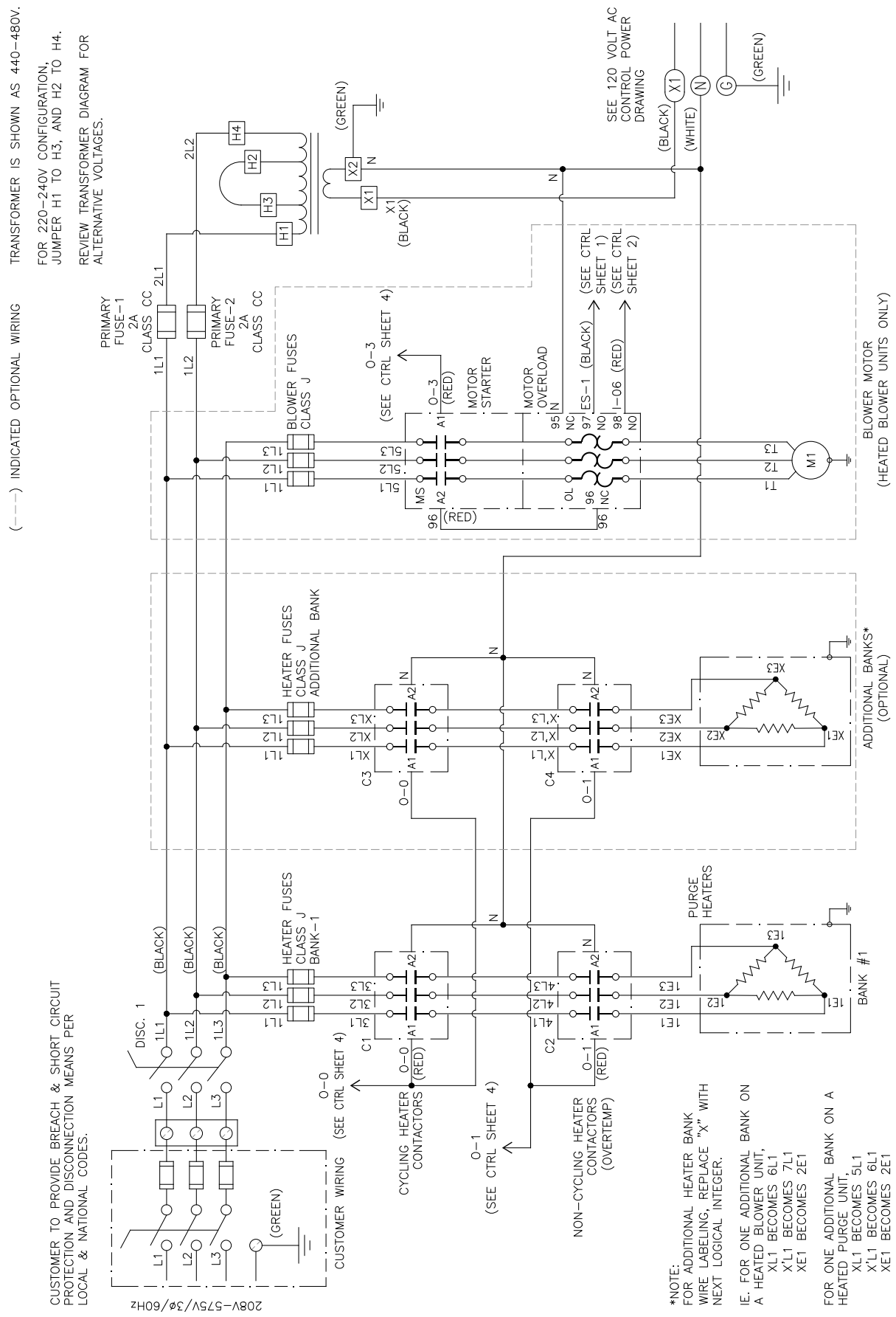


DETAIL B - MIDDLE RAIL

ITEM NO.	QTY.	PART NO.	DESCRIPTION
		100521450	
1	1	100546341	ENCLOSURE 20 X 16 X 8, NEMA 4 WITH MET LAT
2	1	100546346	ENCLOSURE, INNER PANEL, STEEL, 16 IN X 20 IN BOX, WHITE
3	1	REF	CONTROL TRANS-250VA, 480/120V
4	1	REF	CONTACT, IEC, 23A, 110/120V
5	1	REF	OVERLOAD RELAY, 5.4 - 27A
6	2	REF	60A/75A RES., DP CONTACTOR
7	3	100546430	1 IN 4 OUT, POWER DIST BLACK 3 PHS
8	1	100546348	GROUND BAR
9	1	100546481	35 MM DIN RAIL (11 IN L)
10	1	100546481	35 MM DIN RAIL (5 IN L)
11	1	100546481	35 MM DIN RAIL (3 IN L)
12	AR	100546533	FUSE HOLD, CLASS CC, 1 POLE
13	AR	REF	1 POLE GANG., CLASS J, 60 AMP
14	AR	100546594	TERMINAL END BLOCK, END CAP
15	AR	100546709	TERMINAL BLOCK, END STOP
16	AR	100546483	TERMINAL BLOCK - 10-24 GA ZS10
17	2	100546710	GROUND BLOCK
18	1	100546652	1/2", 90 DEGREE LIQUID TIGHT CONDUIT
19	1	100521449	CONNECTOR, 3/4", LT, HUB, STEEL
20	1	100521448	CONNECTOR, 1", LT, HUB, STEEL
21	1	100546364	125 AMP DISCONNECT KIT, NEMA 4
22	2	100546352	JUMPERS (TWO)

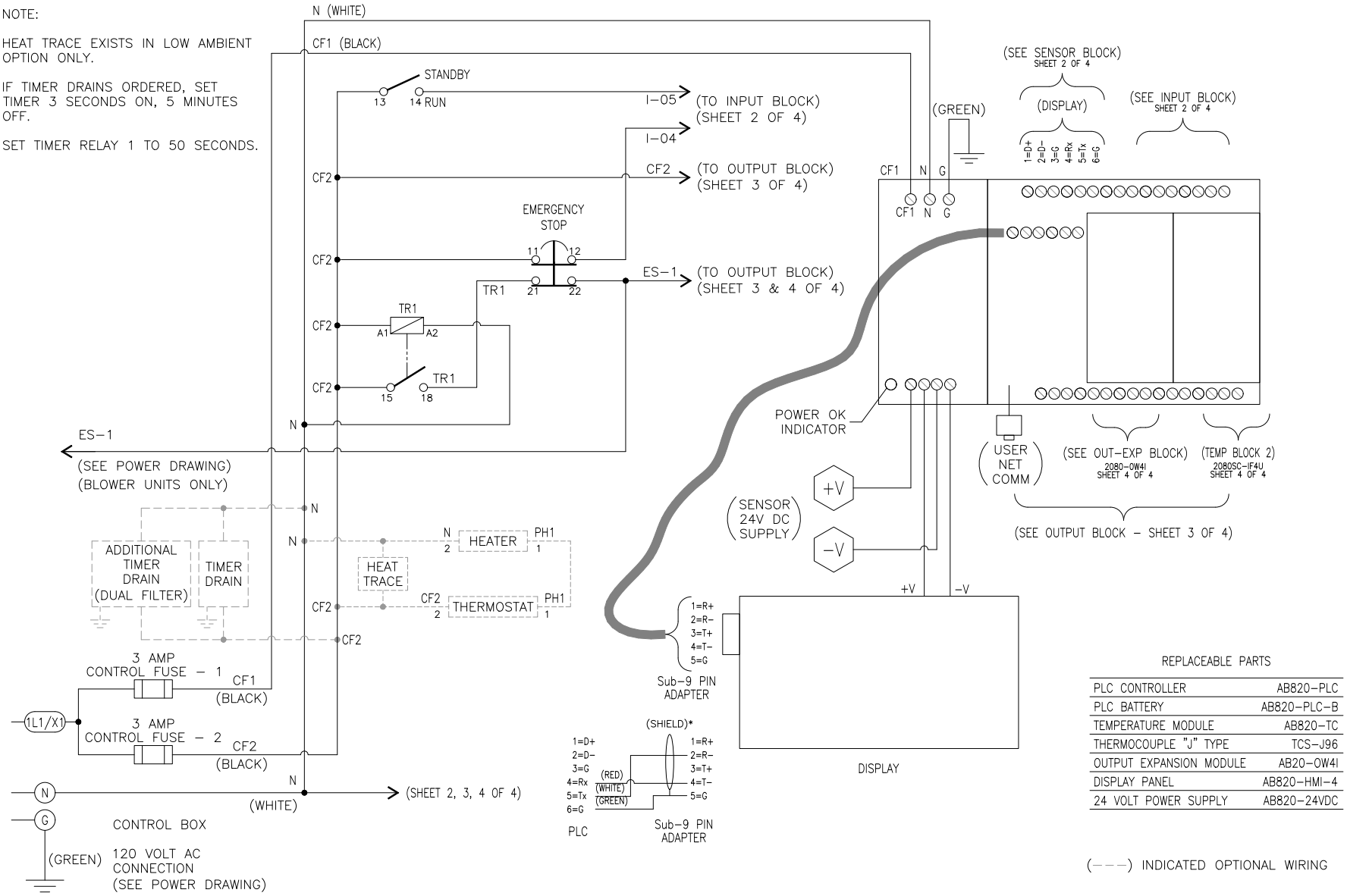
Appendix

Wiring Diagrams



High Voltage

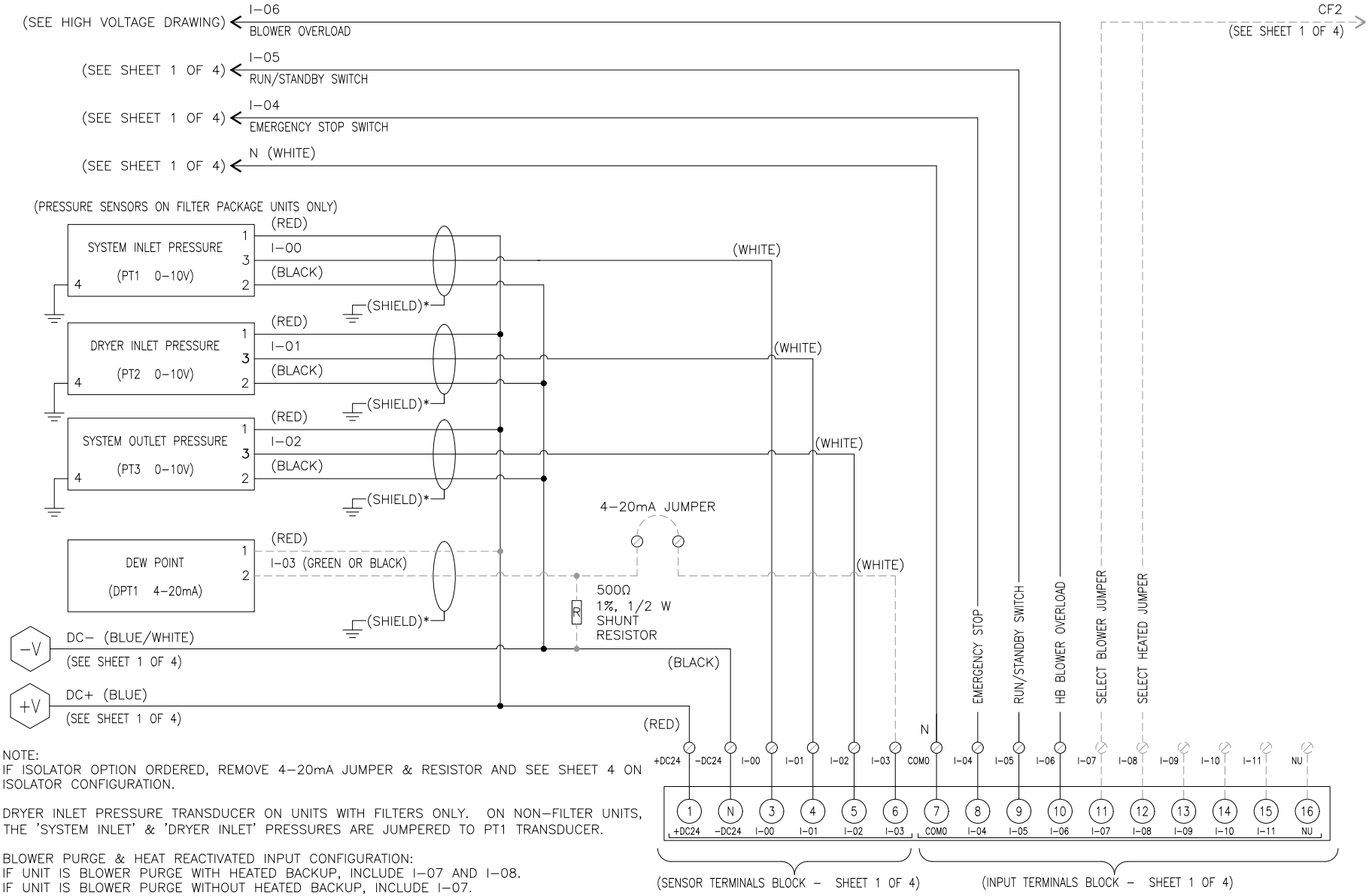
Low Voltage



REPLACEABLE PARTS

PLC CONTROLLER	AB820–PLC
PLC BATTERY	AB820–PLC–B
TEMPERATURE MODULE	AB820–TC
THERMOCOUPLE "J" TYPE	TCS–J96
OUTPUT EXPANSION MODULE	AB20–OW4I
DISPLAY PANEL	AB820–HMI–4
24 VOLT POWER SUPPLY	AB820–24VDC

(– – –) INDICATED OPTIONAL WIRING

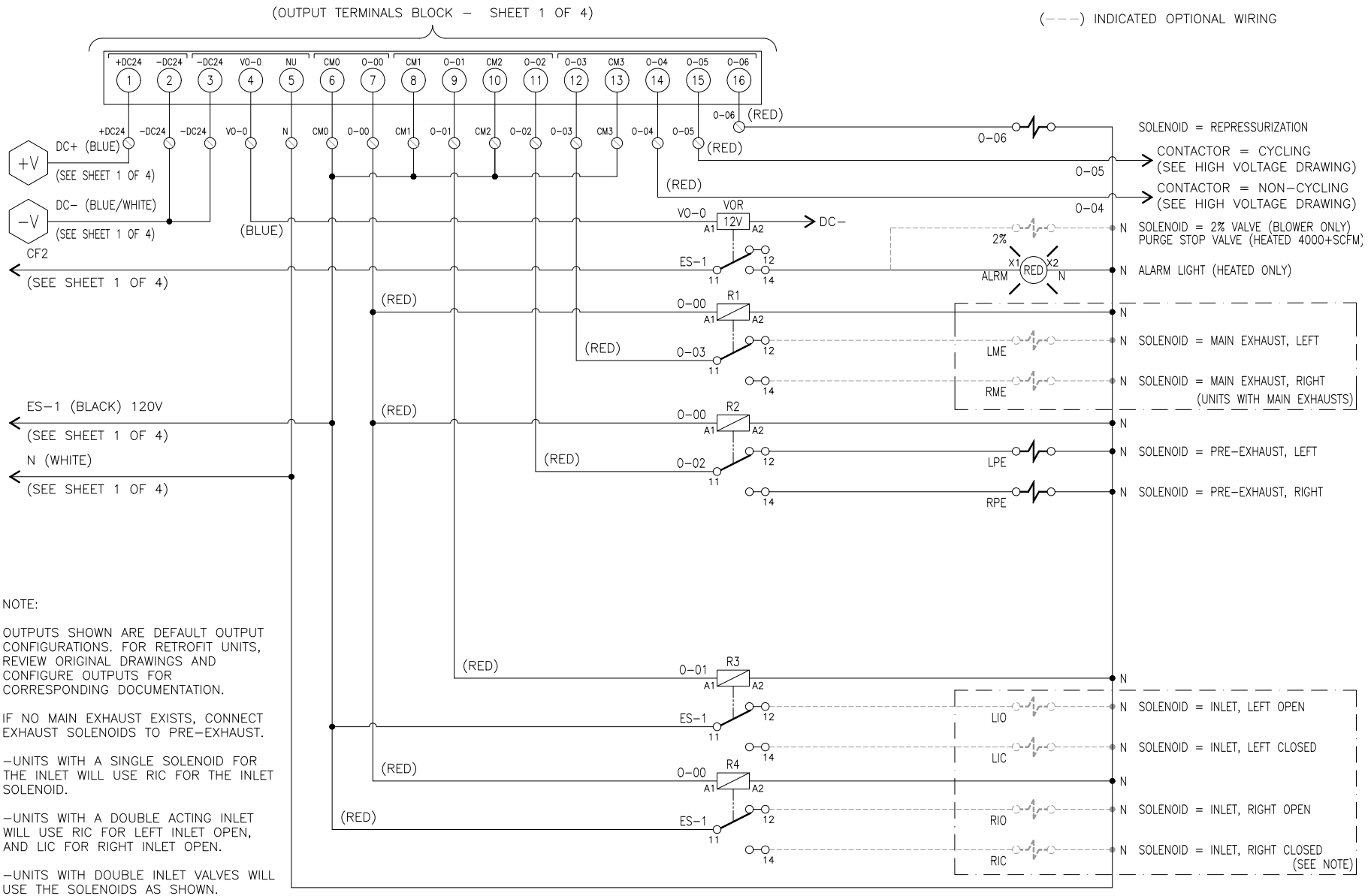


NOTE:
IF ISOLATOR OPTION ORDERED, REMOVE 4–20mA JUMPER & RESISTOR AND SEE SHEET 4 ON ISOLATOR CONFIGURATION.

DRYER INLET PRESSURE TRANSDUCER ON UNITS WITH FILTERS ONLY. ON NON–FILTER UNITS, THE 'SYSTEM INLET' & 'DRYER INLET' PRESSURES ARE JUMPERED TO PT1 TRANSDUCER.

BLOWER PURGE & HEAT REACTIVATED INPUT CONFIGURATION:
IF UNIT IS BLOWER PURGE WITH HEATED BACKUP, INCLUDE I–07 AND I–08.
IF UNIT IS BLOWER PURGE WITHOUT HEATED BACKUP, INCLUDE I–07.
IF UNIT IS HEAT REACTIVATED, INCLUDE I–08.

(– – –) INDICATED OPTIONAL WIRING



NOTE:

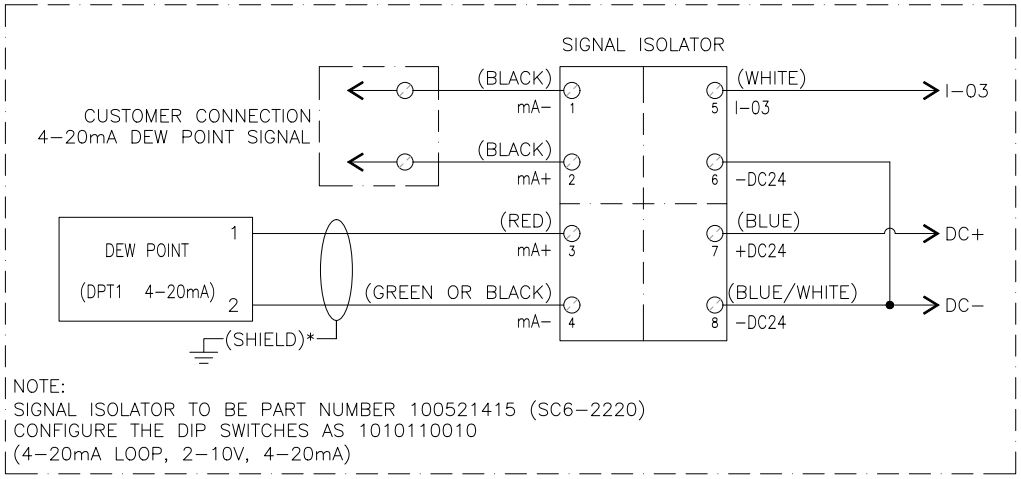
OUTPUTS SHOWN ARE DEFAULT OUTPUT CONFIGURATIONS. FOR RETROFIT UNITS, REVIEW ORIGINAL DRAWINGS AND CONFIGURE OUTPUTS FOR CORRESPONDING DOCUMENTATION.

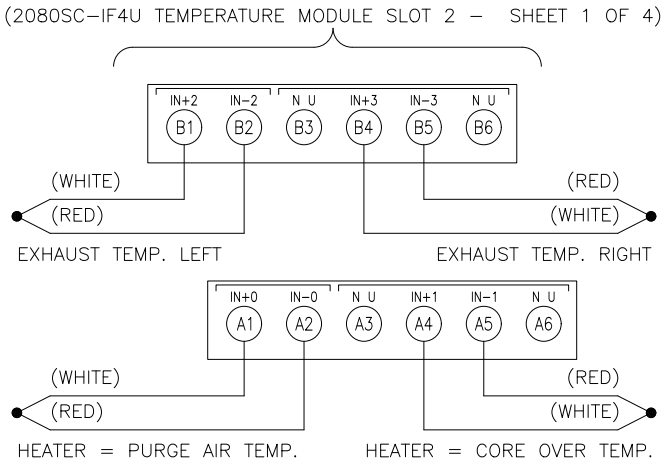
IF NO MAIN EXHAUST EXISTS, CONNECT EXHAUST SOLENOIDS TO PRE–EXHAUST.

–UNITS WITH A SINGLE SOLENOID FOR THE INLET WILL USE RIC FOR THE INLET SOLENOID.

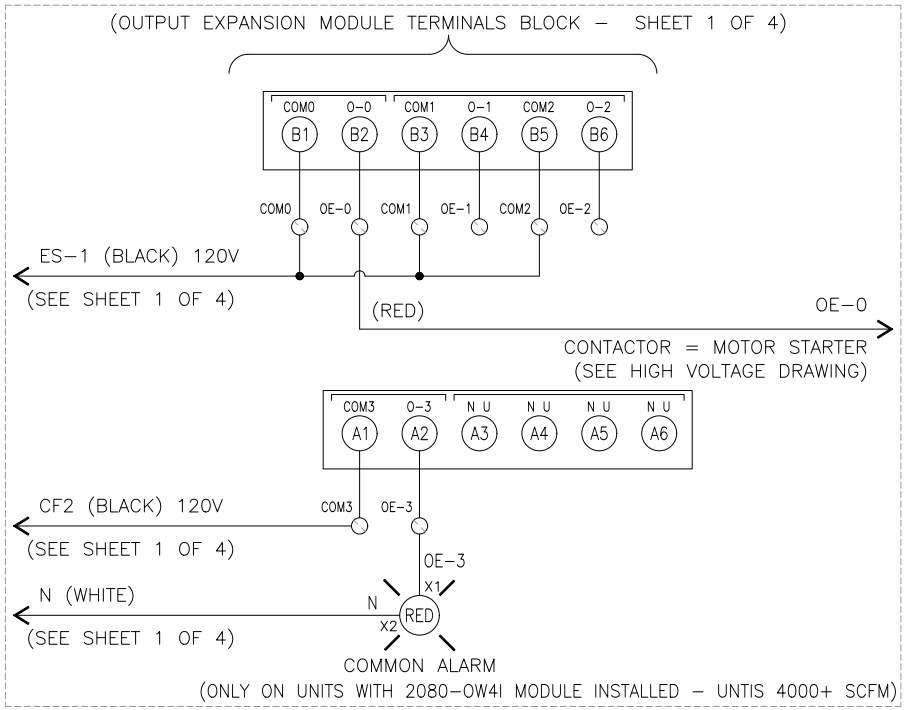
–UNITS WITH A DOUBLE ACTING INLET WILL USE RIC FOR LEFT INLET OPEN, AND LIC FOR RIGHT INLET OPEN.

–UNITS WITH DOUBLE INLET VALVES WILL USE THE SOLENOIDS AS SHOWN.





(– – –) INDICATED OPTIONAL WIRING



Troubleshooting Chart

Error Code	Type	Possible Cause	Test Procedure/Corrective Action
Alarm_BO_Critical_HMI	Critical	Blower overload tripped.	Check the blower motor starter and overload. Verify the setpoint on overload matches the blower nameplate. Press the reset button on overload to engage.
Alarm_BO_Warning_HMI	Warning		Inspect the blower intake filter for contamination. Replace if necessary.
			Verify operations by restarting the dryer and verifying the valve sequencing. Verify 0 PSIG on the regenerating tower to rule out a back pressure condition. Verify amp draw when the blower is running and compare to the nameplate.
Alarm_DewPoint_Failure_HMI	Warning	Dew point probe is disconnected.	Check the dew point probe for proper connection at the DIN connector. Verify the probe is properly inserted into the sample tee. Verify air flow below the probe and sample tubing.
Alarm_DewPoint_High_HMI	Warning	Dew point is high.	Check the dew point probe for proper air flow below sample tubing. Verify probe connections.
			Check the dew point graph to determine if condition is degrading. Check the temperature graph to verify proper heating cycles. If the unit is running too hot or overloaded, contact your Altec AIR representative.
Alarm_DewPoint_OverRange_HMI	Warning	Dew point is over sensor range.	Check the dew point graph to determine if condition is degrading. Check the temperature graph to verify proper heating cycles. If the unit is running too hot or overloaded, contact your Altec AIR representative.
Alarm_DP_AF_HMI	Warning	High after-filter differential pressure.	Check pressure transducer readings in the Sensor Status menu. Verify sensor readings on PT1, PT2, and PT3 match gauges. If so, change the after-filter elements.
Alarm_DP_PF_HMI	Warning	High pre-filter differential pressure.	Check pressure transducer readings in the Sensor Status menu. Verify sensor readings on PT1, PT2, and PT3 match gauges. If so, change pre-filter elements.
Alarm_DP_Sys_HMI	Critical	High system differential pressure.	Check the system inlet and outlet pressure to make sure the maximum system pressure drop does not exceed 15 PSID. Check for air losses and leaking valves. Inspect pre- and after-filter elements and replace as needed.
Alarm_Estop_HMI	Critical	Emergency stop button pressed.	If the emergency stop button has been pressed, pull it out.
			If the emergency stop button has not been pressed, check the CF2 fuse and replace if blown. Verify system operations by using the touch screen to advance through the dryer cycle. If the fuse blows again, contact your Altec AIR representative.
Alarm_LS_LeftTower_HMI	Critical	Left tower drying limit switch or valve position.	Verify the valve is moving to the correct position. If not, check for 120V at the control solenoid coil.
			Check the limit switch for failure. Replace if necessary.
Alarm_LS_RightTower_HMI	Critical	Right tower drying limit switch or valve position.	Verify the valve is moving to the correct position. If not, check for 120V at the control solenoid coil.
			Check the limit switch for failure. Replace if necessary.
Alarm_Maintenance_AfterFilter_HMI	Maintenance	Dirty after-filter.	After-filters should be changed annually under normal operating conditions.

Error Code	Type	Possible Cause	Test Procedure/Corrective Action
Alarm_Maintenance_Blower_HMI	Maintenance	Blower oil requires replacement.	For systems 4,000 SCFM and up using positive displacement blowers only. Replace blower oil annually. Refer to the blower manual for oil type and procedure. Check the drive shaft coupling for integrity when replacing blower oil. Check condition of belts (belt drive blowers only).
Alarm_Maintenance_ BlowerFilter_HMI	Maintenance	Dirty blower intake filter.	Inspect and replace every six months. Environmental factors can influence blower filter integrity. Clean regularly and replace as needed in high particulate or outdoor environments.
Alarm_Maintenance_ ControlFilter_HMI	Maintenance	Dirty control air filter.	Crack petcock drain at bottom of the control filter. Replace immediately if signs of moisture or particulate are present. Replace annually as part of routine maintenance plan.
Alarm_Maintenance_ Desiccant_HMI	Maintenance	Poor desiccant quality.	Access the dew point graph page from the Screen Select menu and review dew point performance. Degrading dew point air quality indicates the desiccant could be nearing end of life.
			Check mufflers for oil and oil residue. If oil is present, the desiccant may be compromised.
			Replace desiccant every three to five years based on productive loading and environmental factors.
Alarm_Maintenance_Muffler_HMI	Maintenance	Exhaust mufflers require maintenance.	Inspect mufflers monthly. Replace every six months to ensure reduced back pressure on the system. Verify tower depressurization is smooth and achieves 0 PSIG on the depressurizing tower. If not, check muffler integrity and contact your Altec AIR representative.
Alarm_Maintenance_PreFilter_HMI	Maintenance	Dirty pre-filter.	Pre-filters should be replaced every six months under normal operating conditions. Verify drain function monthly.
Alarm_PowerFailure_HMI	Critical	Incoming power disconnected.	Power failures typically occur as a result of a plant power surge, environmental factors such as wind or other severe weather, or other events which impact the power grid. Consult a certified electrical technician and contact your Altec AIR representative.
Alarm_Sys_High_HMI	Warning	High system pressure.	Use the Sensor Status menu to verify readings of PT1, PT2, and PT3. If readings are above maximum allowable working pressure, shut down the dryer immediately. Depressurize the system through the filter drain ports and isolate the dryer from system pressure. Do not continue to operate a dryer above its designed maximum pressure. Contact your Altec AIR representative for more information on an overpressure situation.
Alarm_Sys_Low_HMI	Critical	Low system pressure.	Use the Sensor Status menu to verify readings of PT1, PT2, and PT3. If readings are below alarm setpoint (factory setting is 60 PSIG), bypass and isolate the dryer. Check the air compressor. If the air compressor is providing suitable pressure, there may be a valve failure in the dryer system causing excessive pressure loss. Contact your Altec AIR representative for support.
Alarm_TC0_Fault_HMI	Critical	Purge sensor fault.	Use the Sensor Status menu to check the reading on TC0. If the reading is out of range or displays ***, the sensor has faulted. Replace the sensor.

Error Code	Type	Possible Cause	Test Procedure/Corrective Action
Alarm_TC1_Fault_HMI	Critical	Heater core sensor fault.	Use the Sensor Status menu to check the reading on TC1. If the reading is out of range or displays ***, the sensor has faulted. The heater and blower will not engage while a TC1 fault is active. Replace the sensor to resume normal heated system operations.
			If a high core temperature alarm was also tripped, check the temperature graph from the Screen Select menu to determine if a dynamic temperature spike caused the fault. This could be caused by a blower overload trip, excessive back pressure from clogged mufflers, excessive back pressure from valve leakage, failed heating contactors, or other issues. Contact your Altec AIR representative for support.
Alarm_TC1_High_HMI	Critical	High heater core temperature.	Contact your Altec AIR representative for support when a high core temperature alarm is triggered. The heating and blower systems will not engage until the alarm is acknowledged and properly cleared. The system should be stepped through its entire cycle and all functions verified before resuming normal dryer operations.
Alarm_TC1_Low_HMI	Warning	Low heater core temperature.	Check the temperature graph from the Screen Select menu to determine if the heater is engaging as the dryer steps through its cycle. If the heater is functioning properly, check the alarm setpoint for accuracy. Systems in environments with a low ambient temperature may falsely trigger a low temperature alarm.
		Faulty fuses and contactors.	If the heater is not engaging, check for other active alarms that may prevent the heater from engaging. If the heater does not engage after all alarms have been acknowledged and cleared, disconnect power to the dryer and perform a lockout/tagout (LOTO) procedure, then inspect high voltage fuses and contactors in the heater circuit. Perform an ohm check for verification. Contact your Altec AIR representative for support.
Alarm_TC2_Fault_HMI	Warning	Left exhaust sensor fault.	Use the sensor status menu to check the reading on TC2. If the reading is out of range or displays ***, the sensor has faulted. Replace the sensor.
Alarm_TC3_Fault_HMI	Warning	Right exhaust sensor fault.	Use the sensor status menu to check the reading on TC3. If the reading is out of range or displays ***, the sensor has faulted. Replace the sensor.