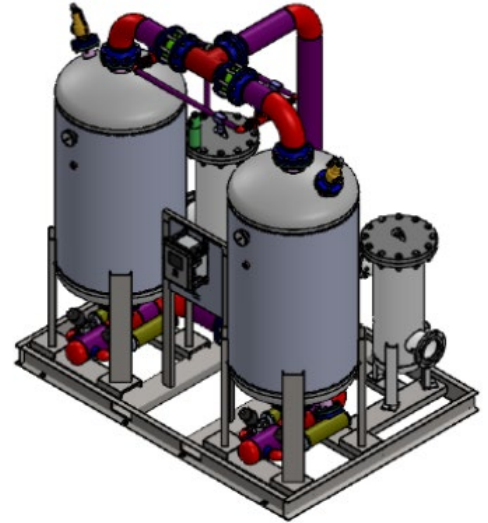
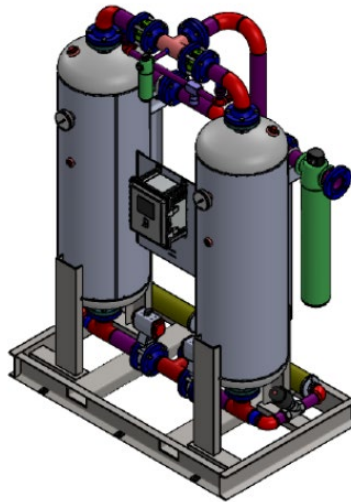
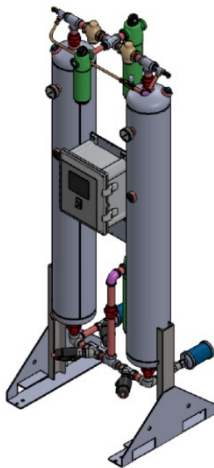




USER/SERVICE MANUAL

DESICCANT HEATLESS REGENERATIVE
COMPRESSED AIR DRYERS
NHDC-2300-TS CONTROLLER

HDD-80 to HDD-5,000



WARRANTY NOTICE

Failure to follow the instructions and procedures in this manual or, misuse of this equipment will VOID its warranty!

DOCUMENT NUMBER:

0911-2300-1 R01

MANUAL:

HDD-2300-UM

SAFETY WARNING

Users are required to read the entire User Manual before handling or using the product. Keep the User Manual in a safe place for future reference.

©NEXT AIR & GAS LLC



These instructions must be thoroughly read and understood before installing and operating this product. Failure to operate this product in accordance with the instructions set forth in this manual can lead to unsafe operating conditions and may void warranty. For additional information, refer to this manual or contact the factory for recommendations. Please have the dryer serial number and model ready when contacting the factory.

This product contains proprietary software. Access to the software is not permitted for any reason without express written approval of Next Air & Gas.

Contact Information

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Section 1

Safety

NOTE



OPERATOR IS REQUIRED TO READ
ENTIRE INSTRUCTION MANUAL.

The dryer has been designed and constructed in accordance with the generally recognized rules pertaining to adsorption technology as well as industrial safety and accident prevention regulations.

The dryer is state of the art. There are, however, hazards to the body, equipment and life accompanying this type of product if it is not operated for the purpose which it is intended by trained and specialized personnel.

The equipment supplied is intended exclusively for drying compressed air. Any other use or one exceeding this is considered unauthorized. **NEXT** cannot be held liable for damages resulting from incorrect or unauthorized use of the equipment. Any such risk is carried solely by the end user.

Authorized use means complete compliance with all the conditions of operation, servicing and maintenance prescribed by **NEXT** in this Instruction and Operation Manual.

The dryer is only to be operated, serviced, and repaired by trained personnel who are familiar with this type of equipment and understand fully its operation and any potential dangers.

1.1 Safety Information

The end user and operator must observe all National, State, and Local industrial and safety regulations dealing with them.

with the operation of pressure vessels under compressed air service. Also, all “end user” safety rules for the same type of service must be adhered to. The following points list some of the important factors dealing with this type of equipment.

- Never make any constructional changes to the equipment
- Use only original spare parts and accessories.
- Never weld on any pressure vessel or modify it in any way.
- All maintenance on “pressure parts” must be carried out with the equipment shutdown, depressurized, and locked out. Any in plant procedures or work permits regarding pressure vessels are to be adhered to.
- Do not operate the equipment with the control panel door open, the electrical system energized, and live parts exposed.
- Disconnect the dryer from the electrical supply when any electrical work is performed. Lock out the safety disconnect and obtain any required work permits.
- The desiccants used in this equipment are not considered hazardous. However, all contact with or disposal of the desiccant should be in accordance with the relevant MSDS. The more common safety measures normally observed during filling operations are:
- In the case of accidental contact of the desiccant with the eyes, rinse immediately with a large amount of clean water. **Refer to the MSDS.**
- Accidental spillage of desiccant on the floor should be cleaned up immediately, taking care to avoid the creation of excess dust during clean up.
- Use a contoured face mask during any filling or draining operations. **Refer to the MSDS.**

1.2 Definition of the Safety Symbols Used



Before attempting any service on the dryer, carefully read the instructions in this User Manual.



General warning sign. Risk of danger or possibility of damage to the machine. Read carefully the text accompanying this symbol.



Electrical hazard. The accompanying text specifies conditions which could result in injury or death. Any related safety instructions must be strictly adhered to.



Danger. Part or system under pressure.



Danger. Component or system which can reach dangerously high temperatures during operation.



Danger. Do not breathe the air treated by this dryer.



Danger. Do not use water to extinguish fire on the dryer or in the surrounding area.



Danger. Do not operate the machine when the parts are under pressure or electric panels are not in place or have been tampered with and changed.



Danger. Machine noise level could be higher than 85 dBA. The dryer must be installed in a dedicated area where people are not normally present. The installer and/or user is responsible for installing the dryer in a way that prevents noise propagation to any nearby work environments. The installer and/or user is also responsible for affixing all noise level safety signs in the installation area.



Attention: User or operator must wear hearing protection before performing any procedure on the dryer. All personnel must select a proper PPD (Personal Protection Device) hearing protector (earmuffs, ear canal caps, or ear plugs) to prevent damage to their hearing.



Maintenance and/or control operation that requires precise execution by qualified personnel.

AIR INLET

Compressed air inlet connection point.

AIR OUTLET

Compressed air outlet connection point.

DRAIN PORT

Condensate drain connection point.



Operations which can be performed by the operator of the machine, if qualified.

NOTE

Text to be taken into account but does not involve any Safety precautions.



In designing this unit, consideration has been given to the protection of the environment:

- The dryer and packaging are composed of recyclable materials.
- The dryer features an energy saving design.

To help honor our commitment, the user should follow the ecological suggestions marked with this symbol.

1.3 Warnings



Compressed air is a hazardous energy source. Never work on the dryer with parts under pressure. Never point the compressed air or the condensate drain jet towards anyone.

The user is responsible for the installation of the dryer in accordance with the instructions given in *Section 4: Installation*. Failure to do so will void the dryer's warranty and could create dangerous situations that result in damage to the equipment or injury or death to personnel.



Only qualified personnel can use and service electrically powered devices. Before attempting any maintenance, the following conditions must be satisfied:

- No part of the machine is under voltage, and it cannot be connected to electrical power.
- No part of the dryer is under pressure, and it cannot be connected to the compressed air system.



Any change to the machine or operating parameters, if not previously verified and authorized by the Manufacturer, creates the possibility of dangerous conditions and will void the machine's warranty.



Do not use water to extinguish fire on the dryer or in the surrounding area.

1.4 Authorized Use of the Dryer

This dryer has been designed, manufactured, and tested only to be used to separate the humidity normally contained in compressed air. Any other use is considered unauthorized. The Manufacturer will not be responsible for any problem arising from unauthorized use; in all such cases, the user will be responsible for any resulting damage.

Moreover, authorized use requires compliance with the installation conditions specified in this manual, in particular: system in compliance with the instructions given in this manual.

The purpose of the machine is the separation of water present in compressed air. The dried air cannot be used for respiration purposes or for operations leading to direct contact with food or food items, unless subjected to further treatment.



- Voltage and frequency of the primary electrical supply must match operational specifications of the user's model.
- Pressure, temperature, and flow rate of the incoming air must match operational specifications of the user's model.
- Ambient temperature must fall within the ranges specified in this manual.

This dryer is supplied tested and fully assembled. The user only needs to install the desiccant into the dryer towers and connect the dryer to the plant's compressed air.

1.5 Instructions for the Use of Pressure Equipment

To ensure the safe operation of pressure equipment, the user must strictly adhere to the following:

1. The equipment must only be operated within the temperature and pressure limits stated on the Manufacturer's name/data plate.
2. No welding is allowed on the pressure vessel, piping, or components.
3. The equipment must not be stored in poorly ventilated spaces, near a heat source, or flammable substances.
4. Vibration must be eliminated from the equipment to prevent fatigue failure.
5. An internal inspection must be carried out at 12- month intervals to check for pressure equipment corrosion. The actual wall thickness of the tower after corrosion should not be less than the minimum thickness indicated on the chart located on the side of the tower.
6. Operation of condensate drains should be checked daily to prevent a build-up of condensate in the pressure equipment.
7. The maximum working pressure stated on the manufacturer's data plate must not be exceeded.
8. All documentation supplied with the equipment (manual, declaration of conformity, etc.) must be kept for future reference.

1.6 Transportation

- Once the integrity of the packaging is verified, place the unit near the installation location and unpack its contents.
- The packaging materials are recyclable. The material must be properly disposed of in a manner complying with the regulations of the destination country.
- Use care when transporting the dryer. Avoid dropping and other physical abuse as some components, if damaged, can affect the machine's working capacity.
- A forklift can be used to transport the dryers, provided the forks are long enough to support its full width and caution is used throughout the move.
- If the dryer is set outdoors or indoors, avoid areas where weather or sunlight can damage the dryer. (The dryer can be damaged by any weather not just severe weather.)
- The dryer must be installed vertically. A minimum of a 1-meter clearance around the dryer is recommended to allow easy access for servicing.

Section 2

Description

2.1 Introduction

This manual contains instructions for the installation, operation, and maintenance of the **HDD— (80- 5,000 CFM)** adsorption dryer.

This manual is intended to familiarize operators quickly with the equipment provided, its construction and operation, and how to carry out any maintenance when required.

Read it through carefully before commissioning the dryer.

Record operating hours, maintenance work and repairs etc. in a logbook.

Follow all instructions carefully to ensure a trouble-free life.

Our warranty is affected if the user fails to follow the instructions and recommendations for the operation and maintenance of the equipment as given in this instruction manual. NEXT warranties its products from defects in material and workmanship for a given period of time; from the startup date with the originally supplied or specified spare parts and under specified operating conditions and maintenance recommendations. Any modification to the equipment without written permission from NEXT will rescind NEXT commitments and void all warranties. Our after-sales service department will be happy to provide advice, service, or any spare parts that you need. Quote the model number, serial number, and date of manufacture on all correspondence with NEXT. This is very important, particularly when ordering spare parts. NEXT reserves the right to make changes or modifications to the equipment designs without notice.

2.2 Adsorber

An adsorber is a pressure vessel filled with desiccant. At each end of the vessel are perforated stainless steel flow distributors and desiccant support screens. The sole purpose of the support screen is to retain the desiccant in the vessel and evenly distribute the process and regeneration flows across the area of the desiccant bed for optimum drying and regeneration.

2.3 Valves

Inlet valves are piston type stainless steel angle body valves, dryers up to 600 CFM/and High-performance Butterfly valves for 800 CFM and up are used for tower switching and are equipped with a Normally open pneumatic actuator.

Purge Exhaust valves are piston type stainless steel angle body (up to 600 cfm) and high-performance butterfly valve 800 CFM. valves are equipped with Spring Load Normally close. actuator. (Note: in case of any power failure the exhaust valves will be closed, and inlet valve will be open. (Fail safe design

2.4 Actuators

Each valve is equipped with an actuator. Dry instrument quality compressed air is used for pilot actuation. A minimum air pressure of 90 – 110 psig /6.2 -7.5 bar is required.

2.5 Desiccant

For this drying application an Activated Alumina desiccant is used

Amount	___lbs / ___ kg per vessel
Density	48 lbs./cf / 21kg/cm
Size	3/16" diameter

2.6 Pressure Gauge

The dryer system is fitted with pressure gauges and Pressure on each vessel solely for the purpose of “local” pressure indication. Do not replace pressure gauges with liquid filled type.

Section 3

Specifications

3.1 Type of Construction

- Designed for operation indoors in a Non-hazardous location. The electrical equipment is constructed to NEMA 12 as standard unless an optional adder has been added, (N4, N4x, N7).
- Fully automatic, Heatless regenerated twin tower desiccant dryer.

3.2 Ambient Conditions

Atmospheric Pressure	14.7 PSI	1 Bar
Ambient Temperature Minimum	38°F	3°C
Ambient Temperature Maximum	125°F	51°C

3.3 Standard Outlet Dew Point

Standard	(-40°F)	(-40°C)
Optional Dew Point	(-100°F)	(-73°C)

3.4 Desiccant

Amount	___ lbs ___ kg per vessel
Density	48 lbs. / cf / 21 kg/cm
Size	3/16" diameter

3.5 Adsorption

Medium	Compressed Air
Condition	Free from dirt, oil Condensation & Contaminants
Inlet flow	___ scfm/ ___ scms
Min. inlet pressure	85 psig
Normal Inlet pressure	100 psig
Max. inlet pressure	125 psig
Inlet Temperature	100°F / 38°C
Outlet pressure dew point	-40°F / 40°C (with dry air cooling)
Desiccant type	Activated Alumina (F-200)
Amount per Vessel	___ lbs / ___ kg

3.6 Desiccant Chambers

Design Pressure	200 PSIG (80-1500) 150 psig (2000-10000)
Design temperature	400 °F / 204 °C (-20°F/-28°C at 150 psig/ 10 bar)
MDMT	
Materials of Construction	SA516 GR.70, SA53 Gr.B, SA105

3.7 Pre & After Filters

Design pressure	232 psig/ 16 bar
Design Temperature	36 ° to 250 °F / 2 ° to 121°
Materials of Construction	Cast aluminum, up to 1600 CFM/ .75 CMS (Carbon Steel ASME Coded)

3.8 Pipe Manifold Details

Wet air inlet	____ inch sch.40 pipe
Dry air outlet	____ inch sch.40 pipe
Regeneration outlet	____ inch sch.40 pipe

3.9 Electrical Data

Power Supply	115/ 1 /60-110/1/50
OP+	208/230/1/50-60 HZ
Electrical Enclosure	Nema 12
Control voltage	120 volts A.C.
Solenoid coil voltage	120 volts A.C.

3.10 Time, Pressure, Temperature, Dewpoint Settings.

Adsorption time cycle	6 / 10 /15 minutes
Regeneration time cycle	2 / 4/ 6.5 minutes
Repress Time cycle	1 minute
Adsorption Pressure	100 psig / 6.9 bar (min)
Demmand Cycle Control	(-40°F) / (-40°C)
High Dew Point alarm setting	(0°F)

3.11 Dim's & Weight

Width	____ inches / ____mm
Height	____ inches / ____mm
Depth	____ inches / ____mm
Weight	Approx. ____ lbs / ____kg

3.12 Filter Models

Pre-Filter Model	_____
Pre-Filter Element	_____
After Filter Model	_____
After Filter Element	_____
Control Air Filter	_____
Control air Element	_____

3.13 Electrical Certification

UL	Certified -std
cUL	Certified - std
CSA	Optional

3.14 Pressure Vessel Certification

The desiccant chamber pressure vessels are constructed to the latest ASME Code, Section VIII, Division 1, CRN.

Amount	____ lbs. ____kg per vessel
Density	48 lbs. / cf / 21 kg/cm
Size	3/16" diameter

3.15 DATA Label



Model Number	HDD-1250
Part Number	HDD-1250
Serial Number	HDUFBBawe3300
Date of Manufacture	JUNE-2023
Rated Flow	1250 SCFM
Max Ambient Temp	125 Deg F
Min Ambient Temp	38 Deg F
Max Working Air Inlet Temp.	100 Deg F
Max Working Air Pressure	150 PSIG
Design Pressure	200 PSIG
Power Supply / FLA	115-1-60 / 2 FLA
Control Filter Element	EF-050-X-566
Pre-Filter Element	EF-1350-Y-597
After-Filter Element	EF-1350-X-585
Desiccant / Quantity	AC-F200-3/16" / 1450 LBS.
Country Of Origin	U.S.A.

Part Number 
HDD-1250

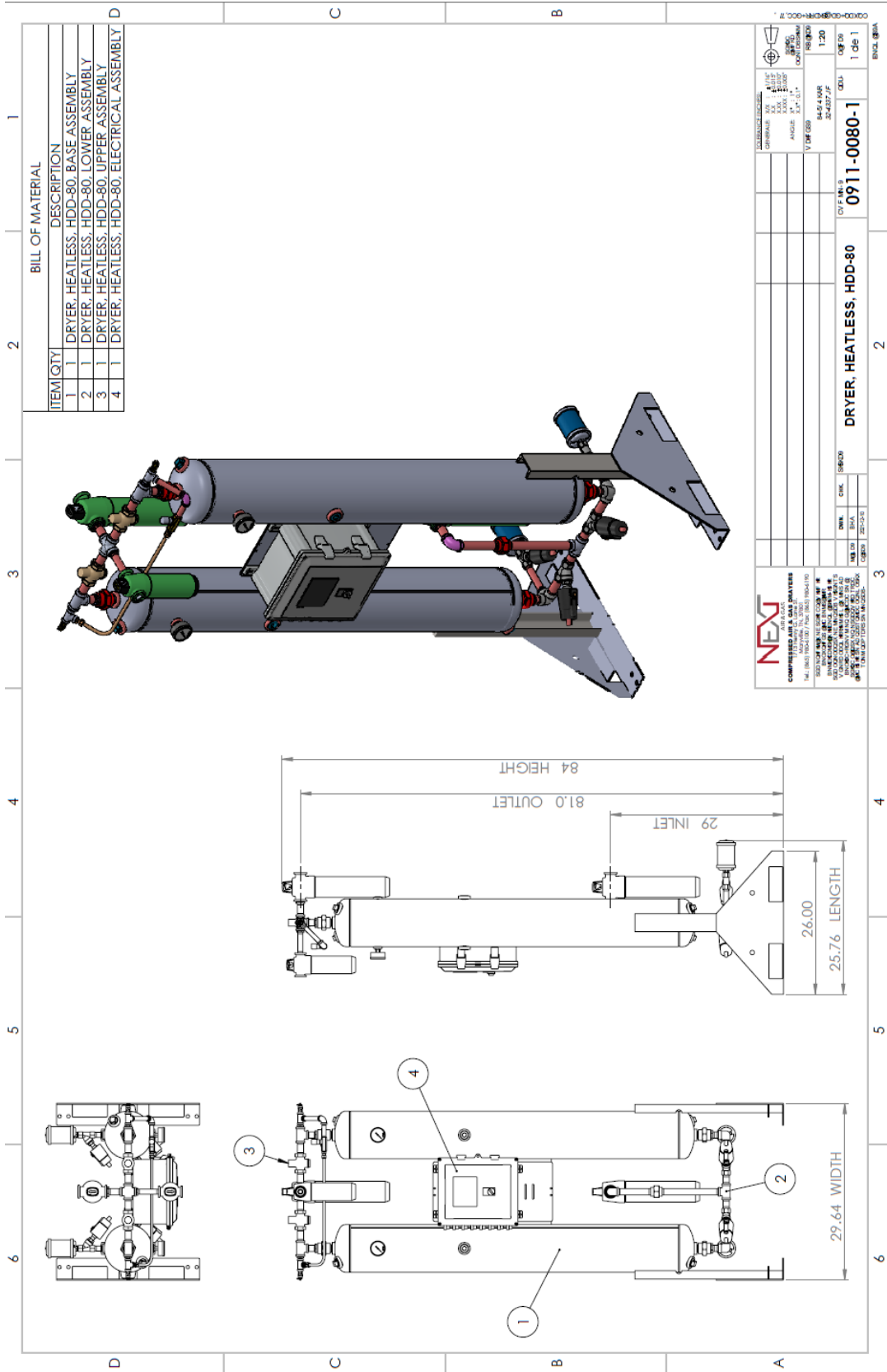
Serial Number 
HDUFBBawe3300

NEXT AIR & GAS

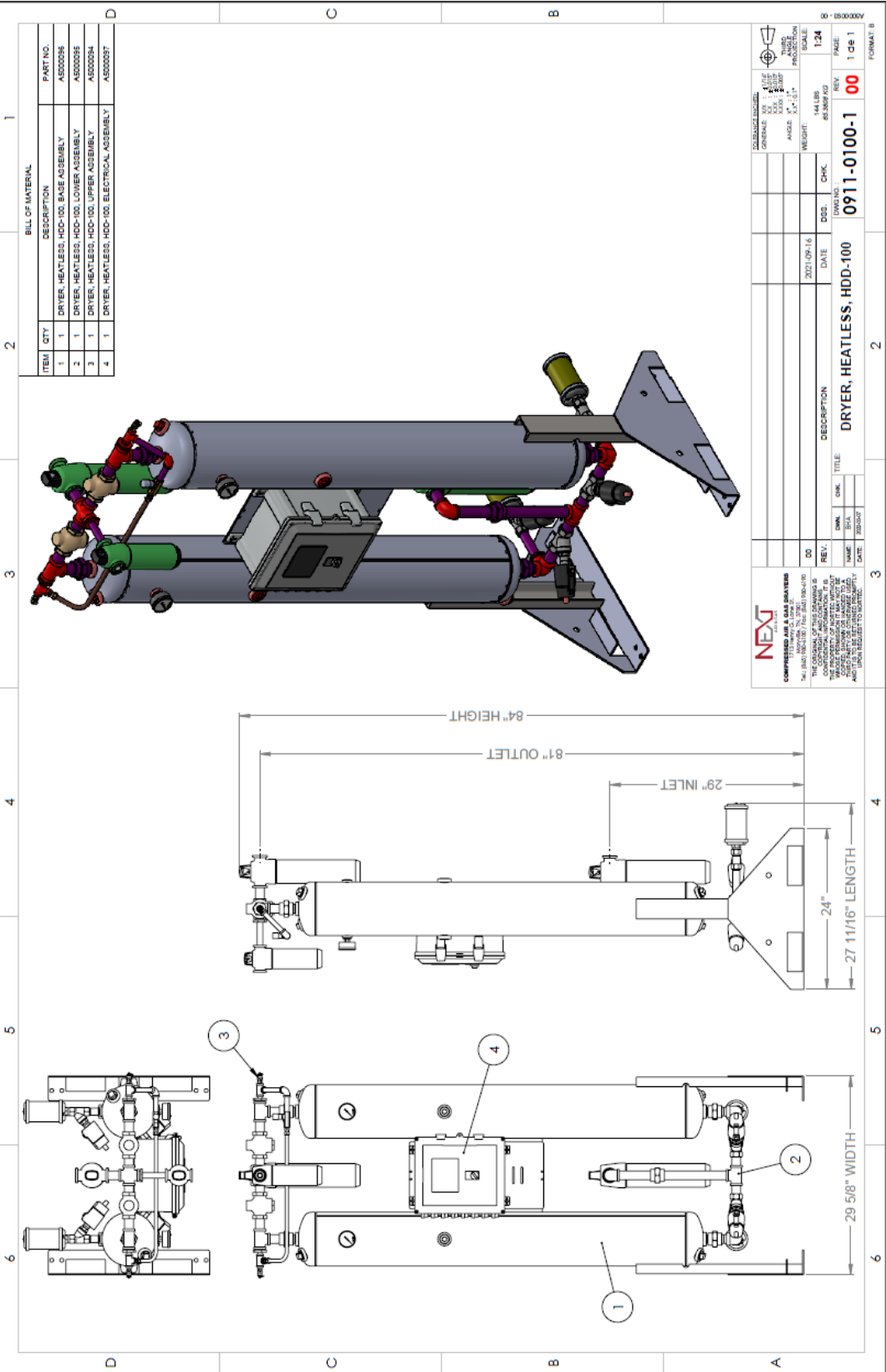
991 GLADSTONE ROAD LENOIR CITY, TN 37771

The following data label is located on the back of the center plate of the compressed air dryer. The dryer identification plate shows all the primary data values of the dryer. Upon installation, fill the below data label tag (shown in Figure 1A) with any information located on the dryer. This data label tag will be useful for the reference of the manufacturer should you require spare parts, service, or use of the general warranty period.

3.16 ID, HDD 80



3.17 ID, HDD-100



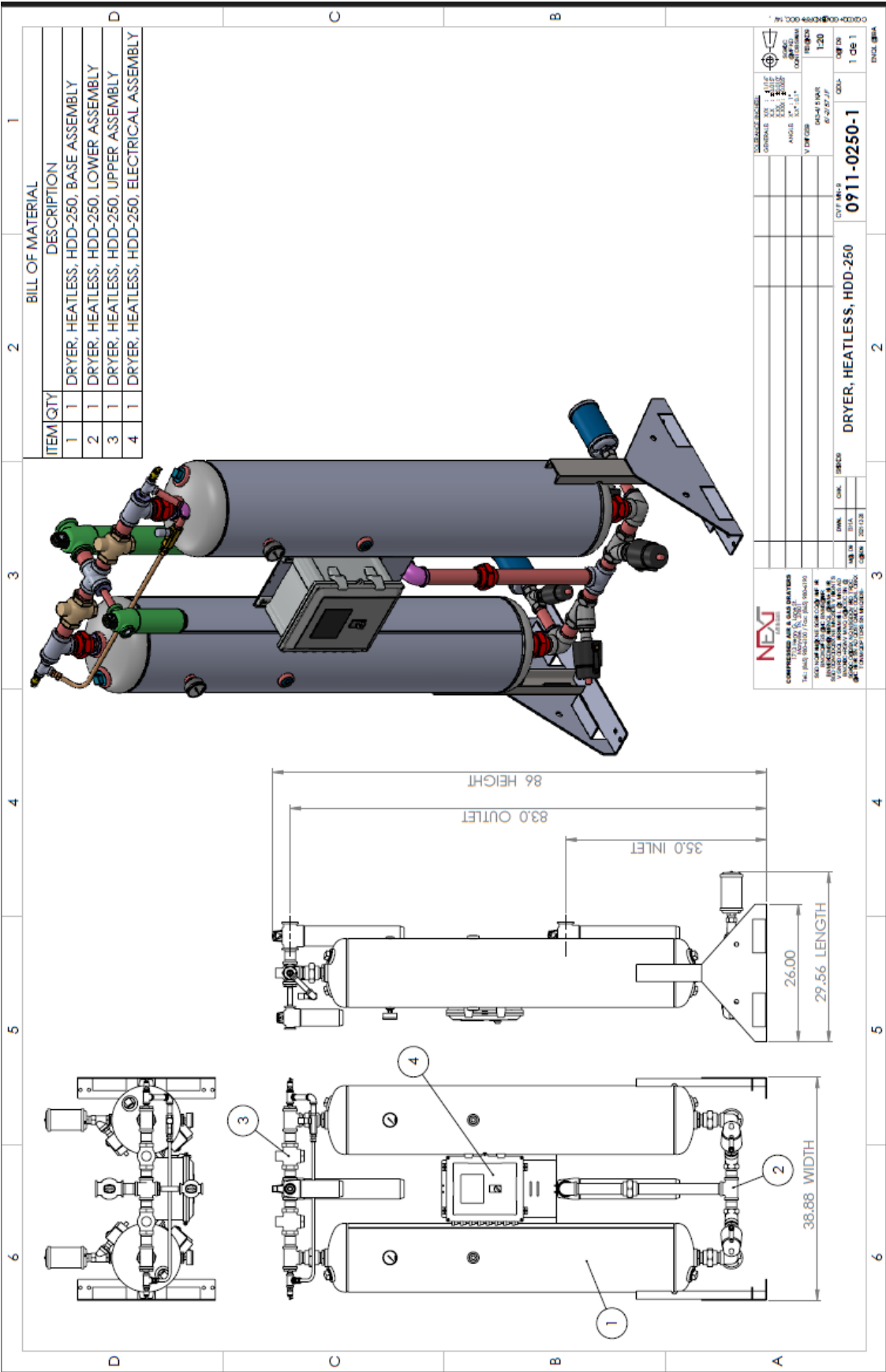
3.18 ID, HDD-125

QTY	UNIT	DESCRIPTION
1	EA	DRYER, HEATLESS, HDD-125, ELECTRICAL ASSEMBLY
1	EA	DRYER, HEATLESS, HDD-125, UPPER ASSEMBLY
1	EA	DRYER, HEATLESS, HDD-125, LOWER ASSEMBLY
1	EA	DRYER, HEATLESS, HDD-125, BASE ASSEMBLY

NO.	QTY	DESCRIPTION
1		DRYER, HEATLESS, HDD-150, BASE ASSEMBLY
2		DRYER, HEATLESS, HDD-150, LOWER ASSEMBLY
3		DRYER, HEATLESS, HDD-150, UPPER ASSEMBLY
4		DRYER, HEATLESS, HDD-150, ELECTRICAL ASSEMBLY

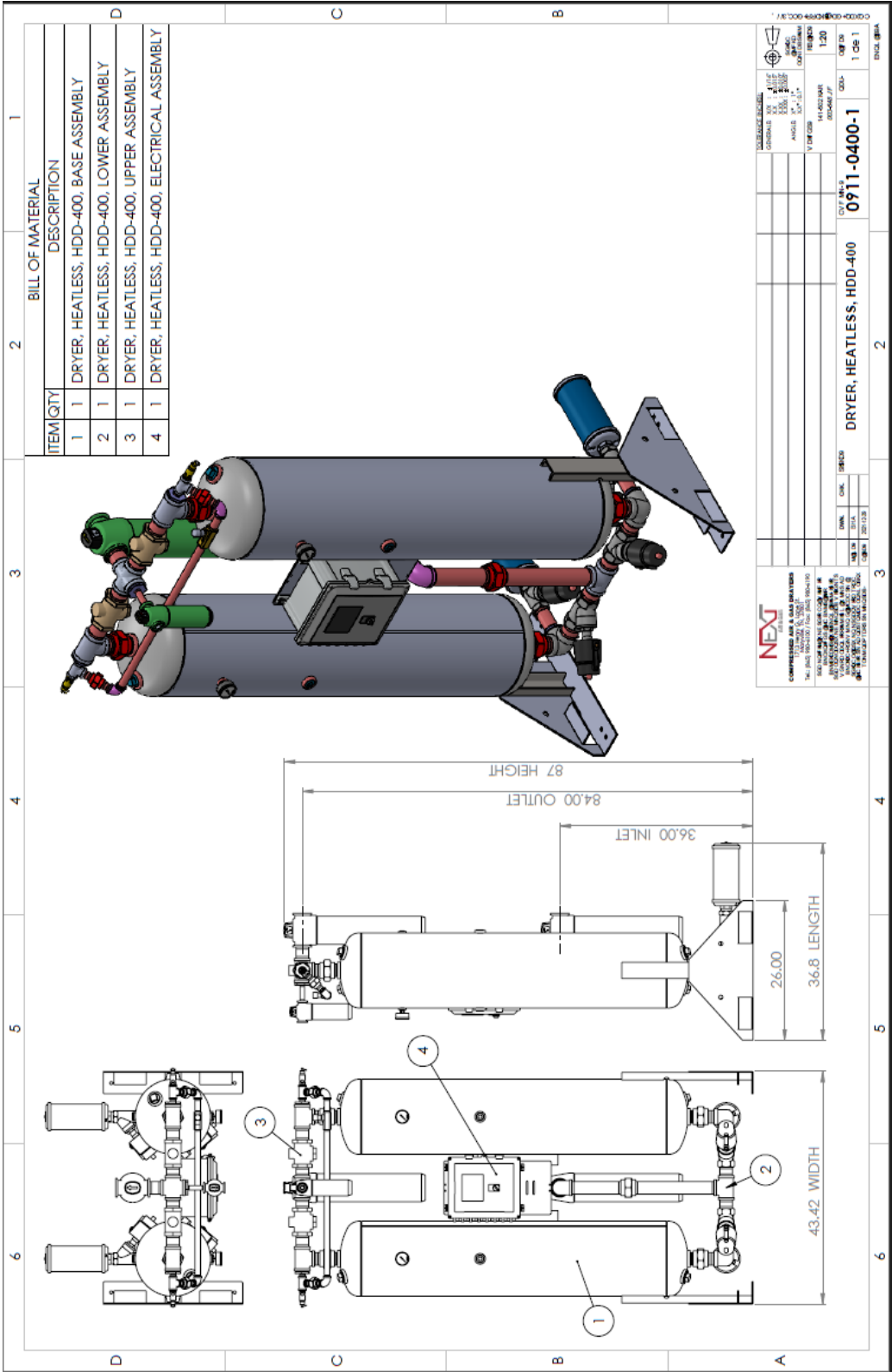
NO.	QTY	DESCRIPTION
1		DRYER, HEATLESS, HDD-200, BASE ASSEMBLY
2		DRYER, HEATLESS, HDD-200, LOWER ASSEMBLY
3		DRYER, HEATLESS, HDD-200, UPPER ASSEMBLY
4		DRYER, HEATLESS, HDD-200, ELECTRICAL ASSEMBLY

3.21 ID, HDD 250

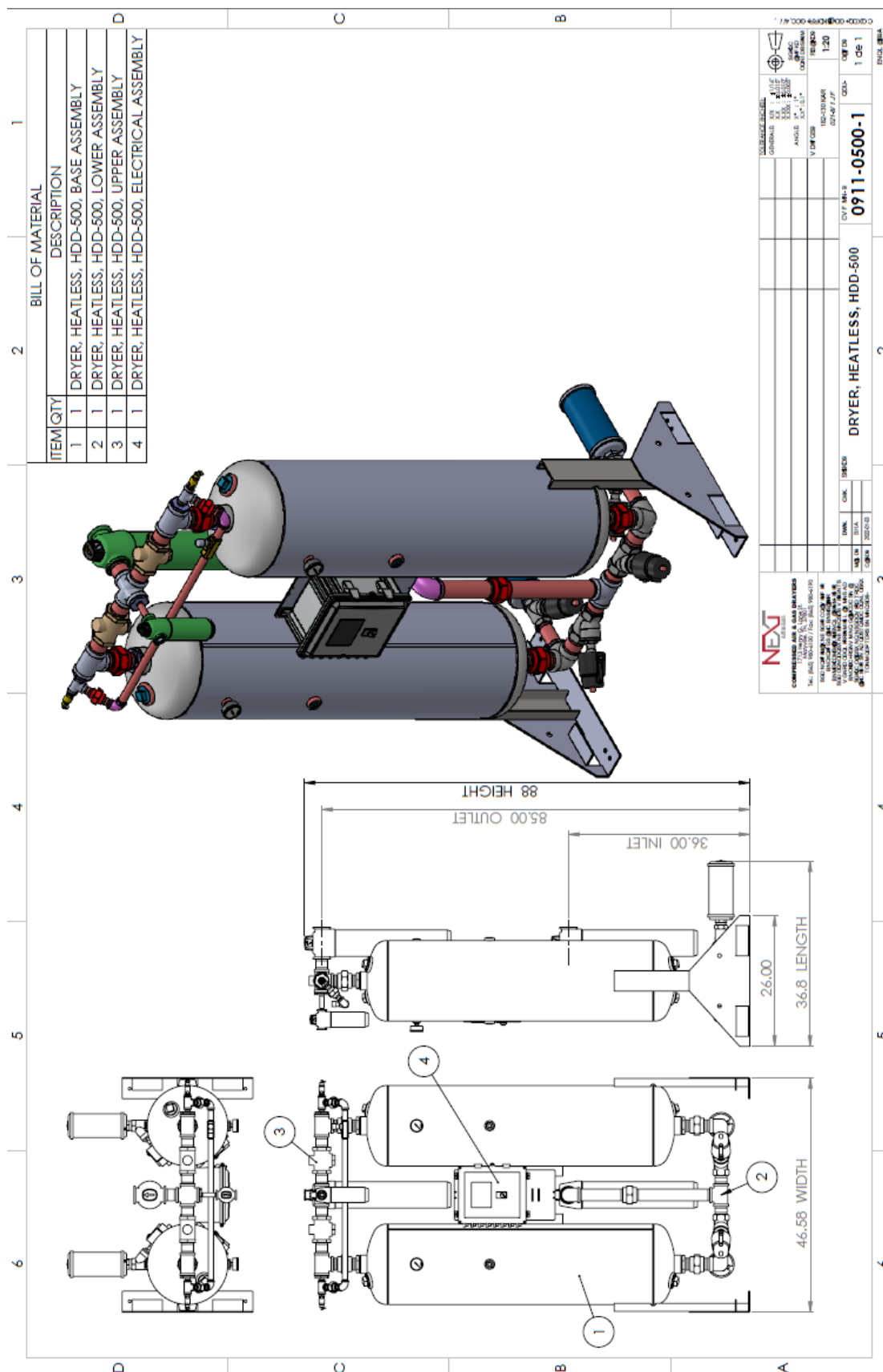


ITEM	QTY	DESCRIPTION
1	1	DRYER, HEATLESS, HDD-300, BASE ASSEMBLY
2	1	DRYER, HEATLESS, HDD-300, LOWER ASSEMBLY
3	1	DRYER, HEATLESS, HDD-300, UPPER ASSEMBLY
4	1	DRYER, HEATLESS, HDD-300, ELECTRICAL ASSEMBLY

3.23 ID, HDD-400

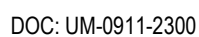


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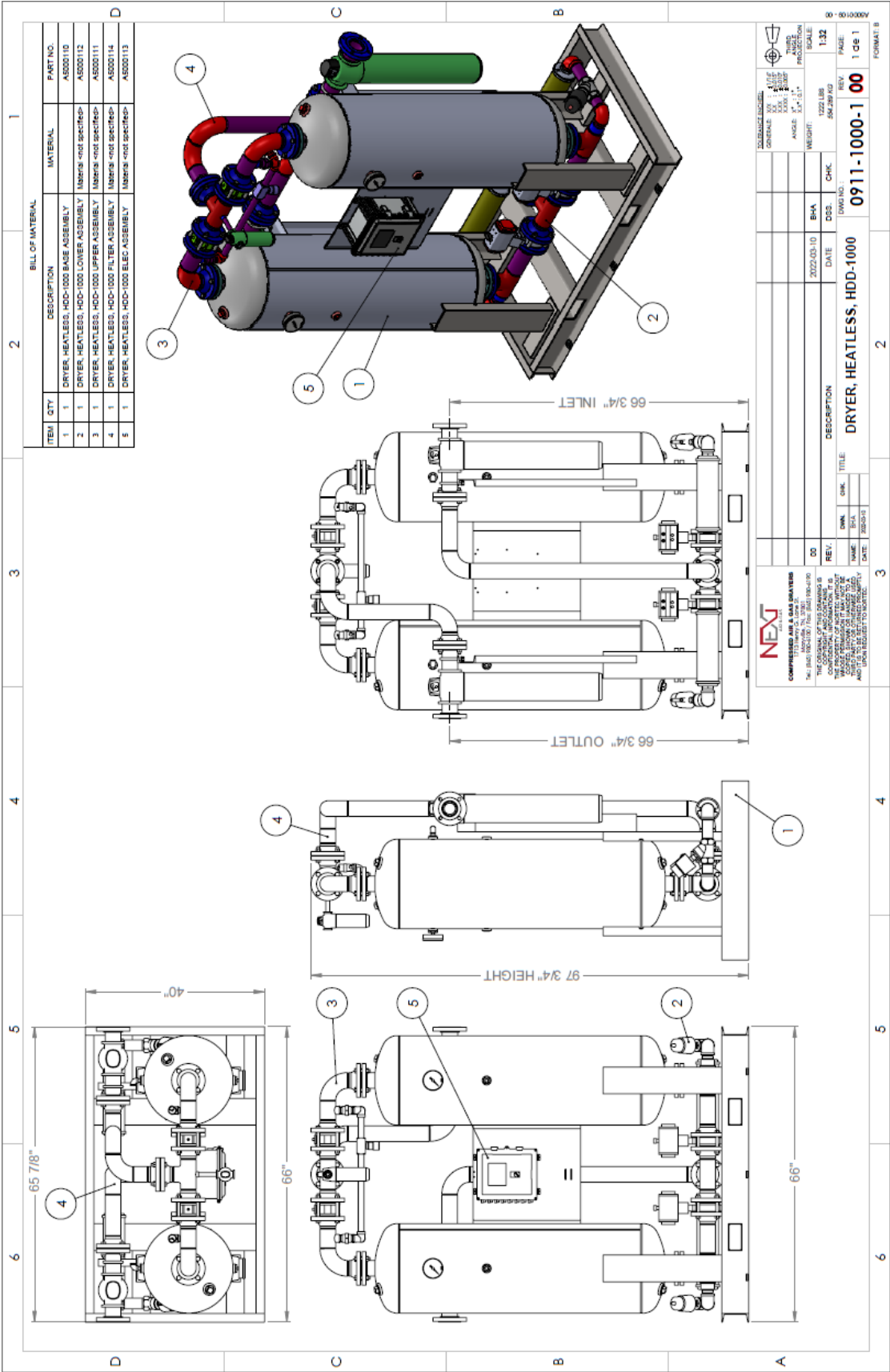


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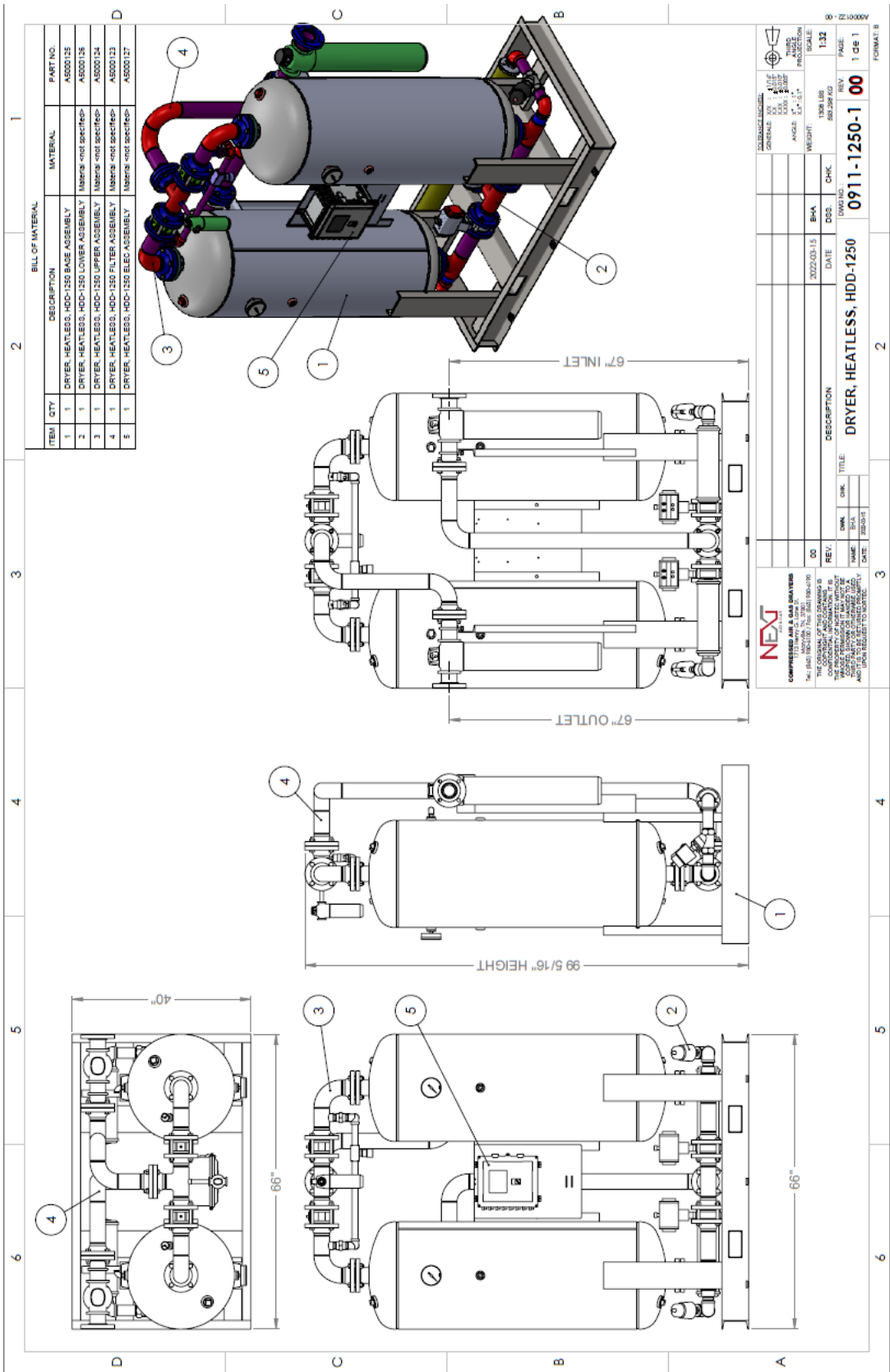
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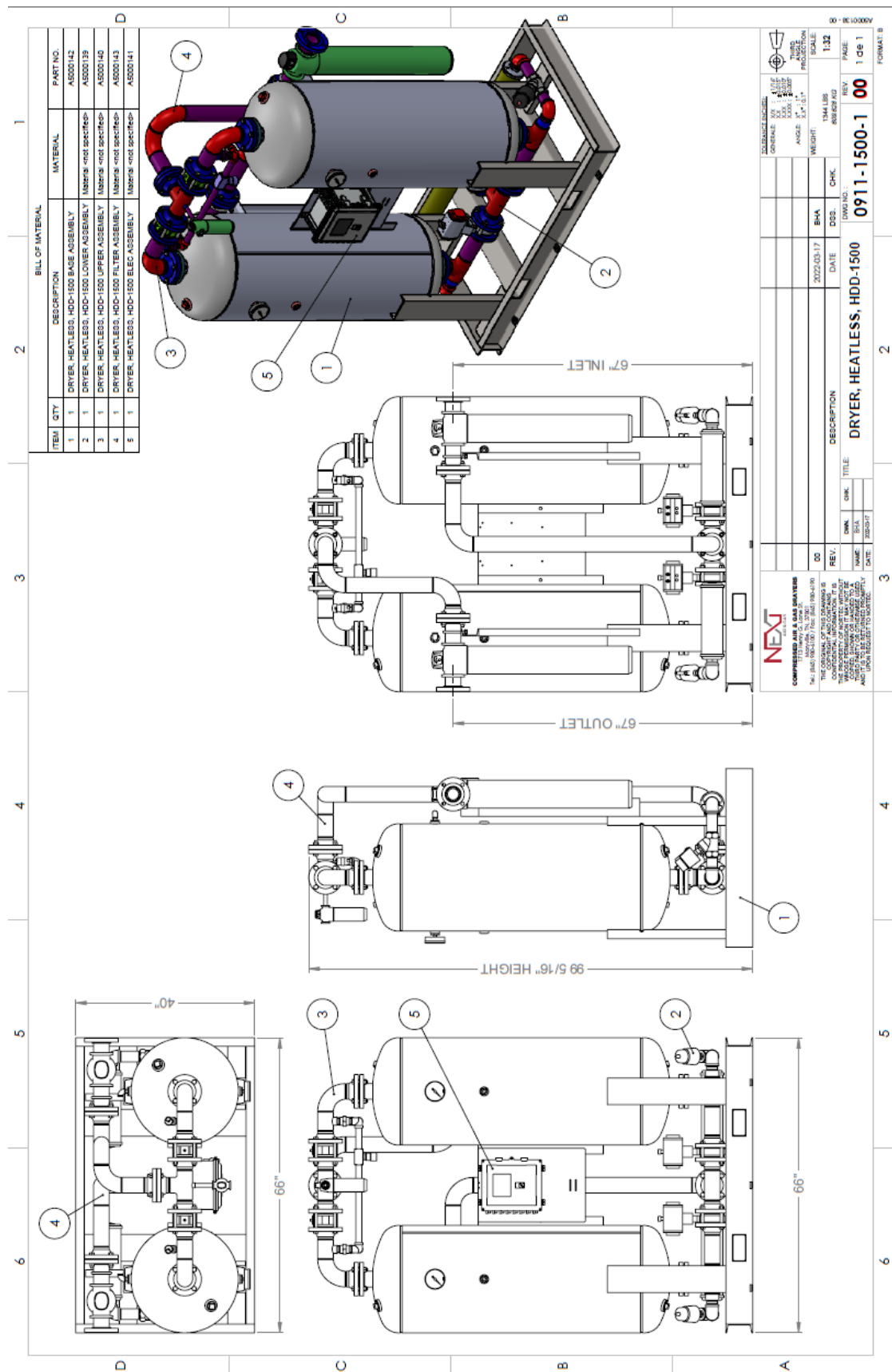
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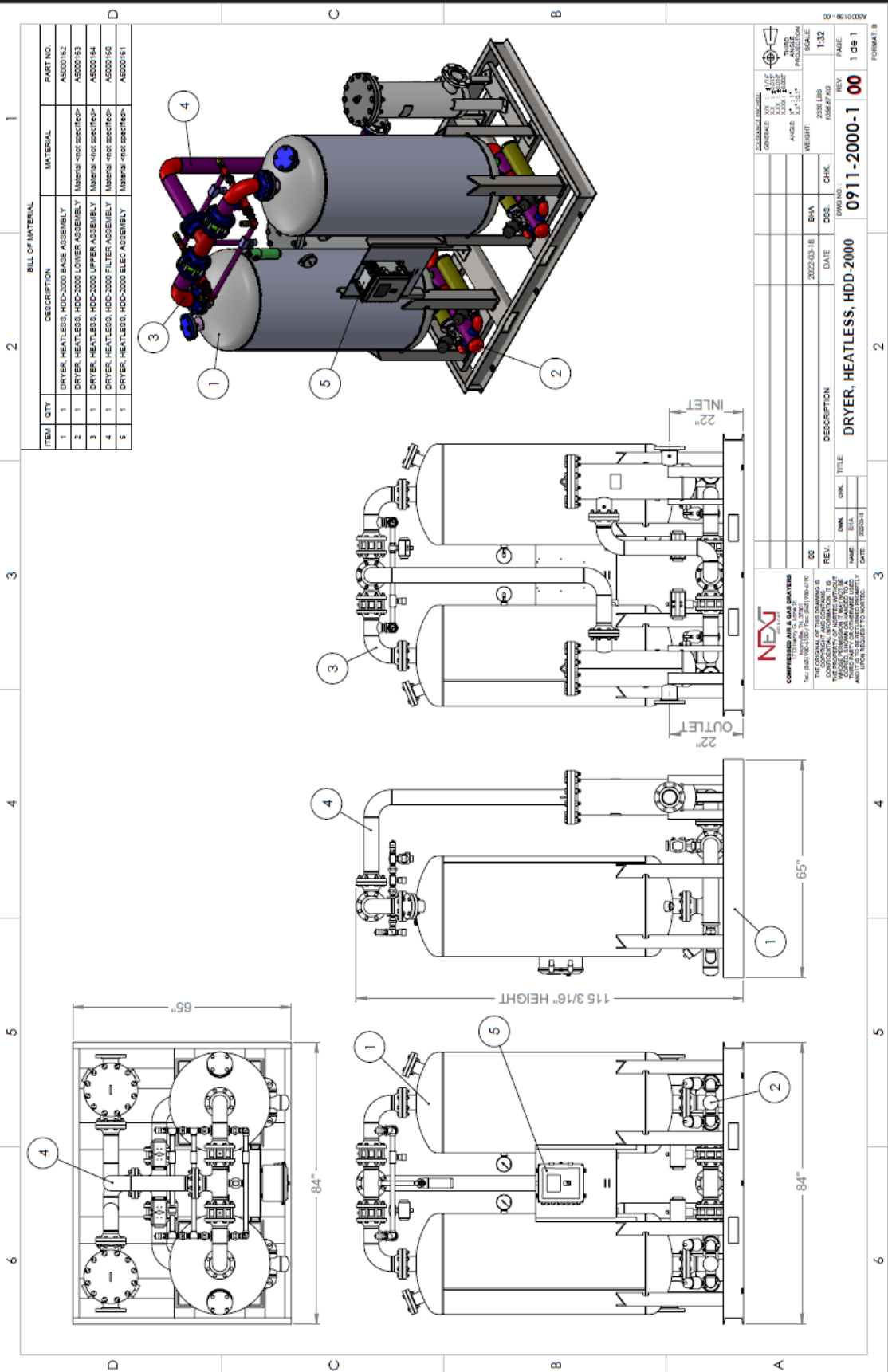
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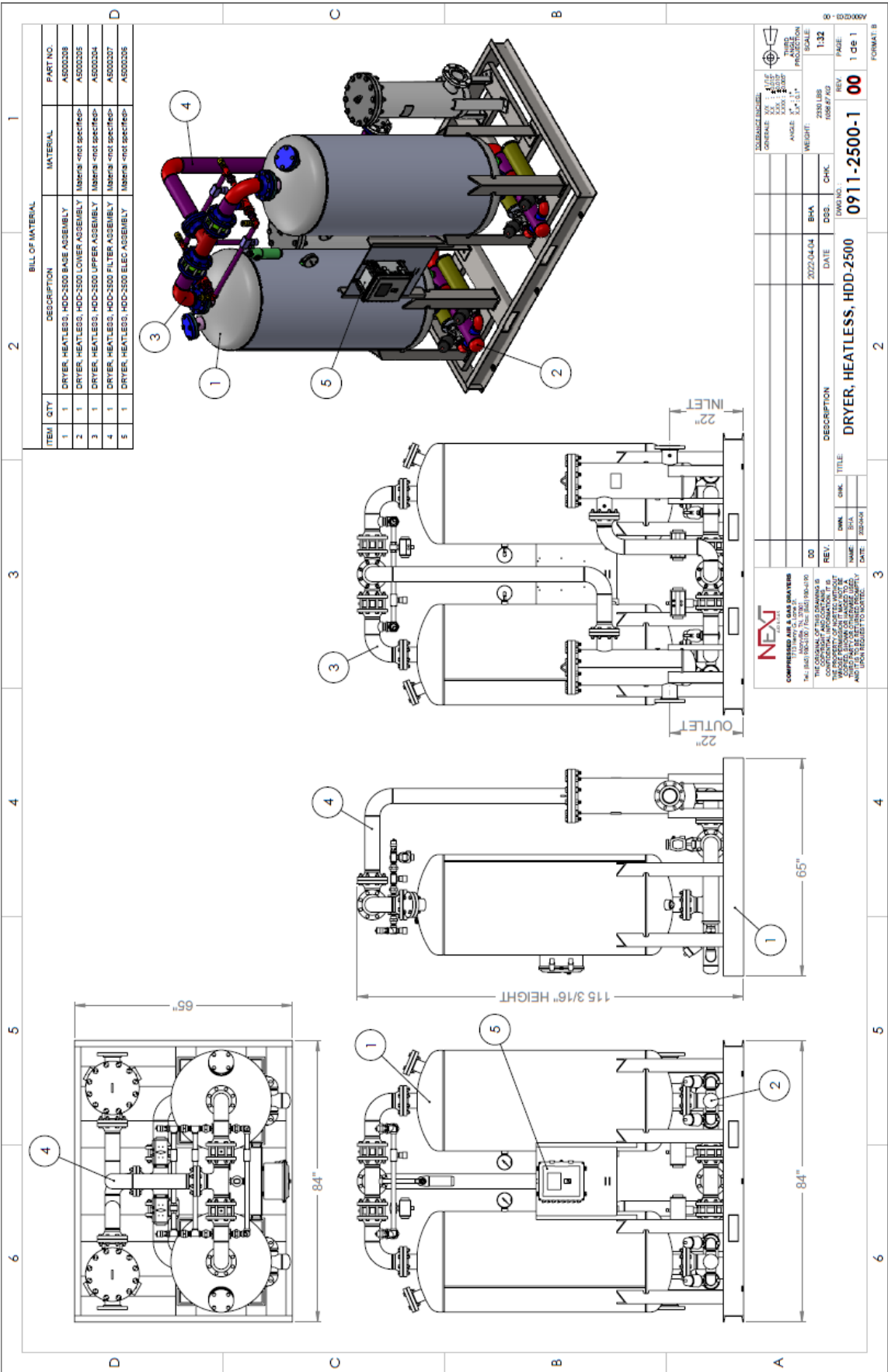
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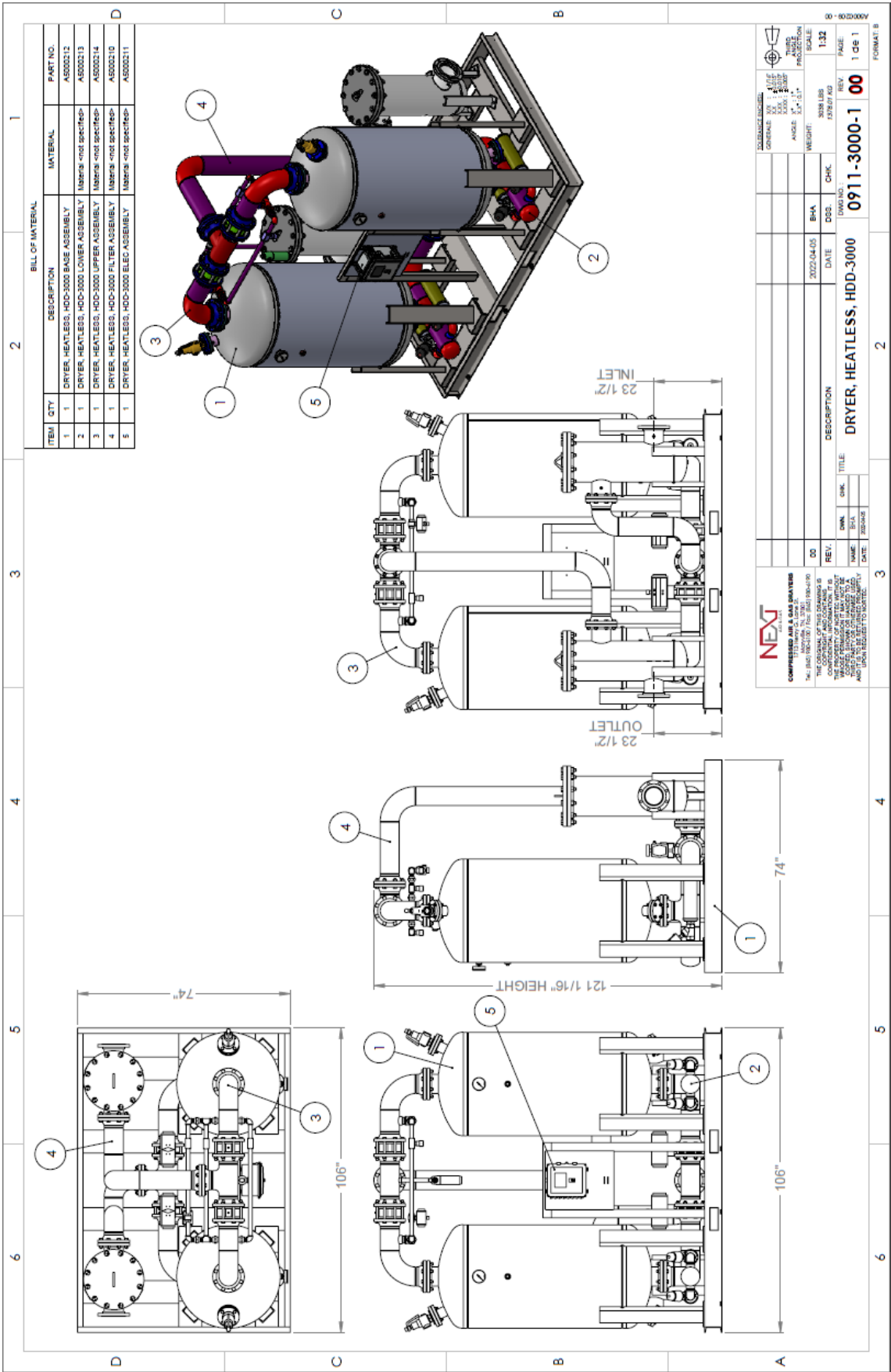
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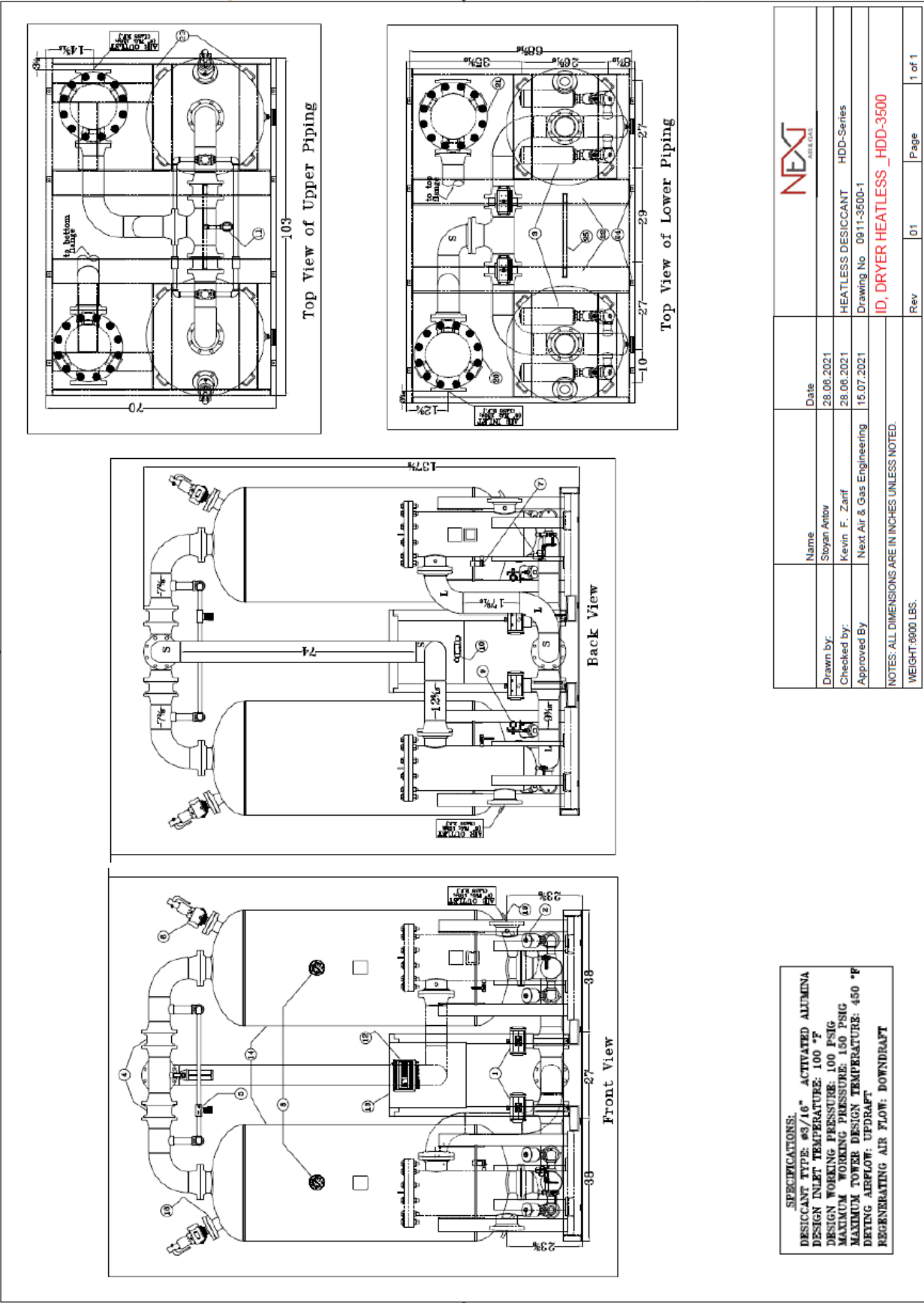
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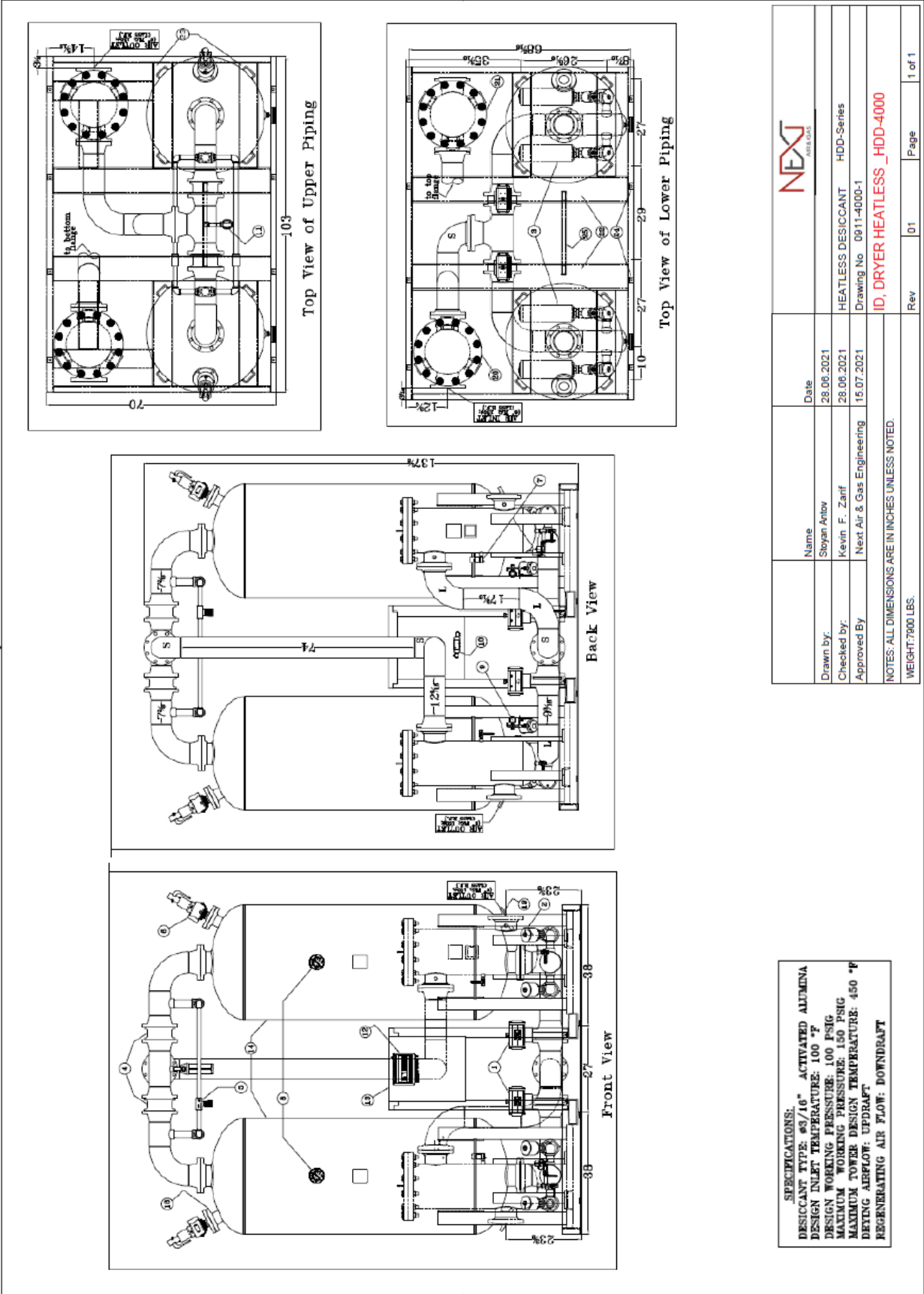
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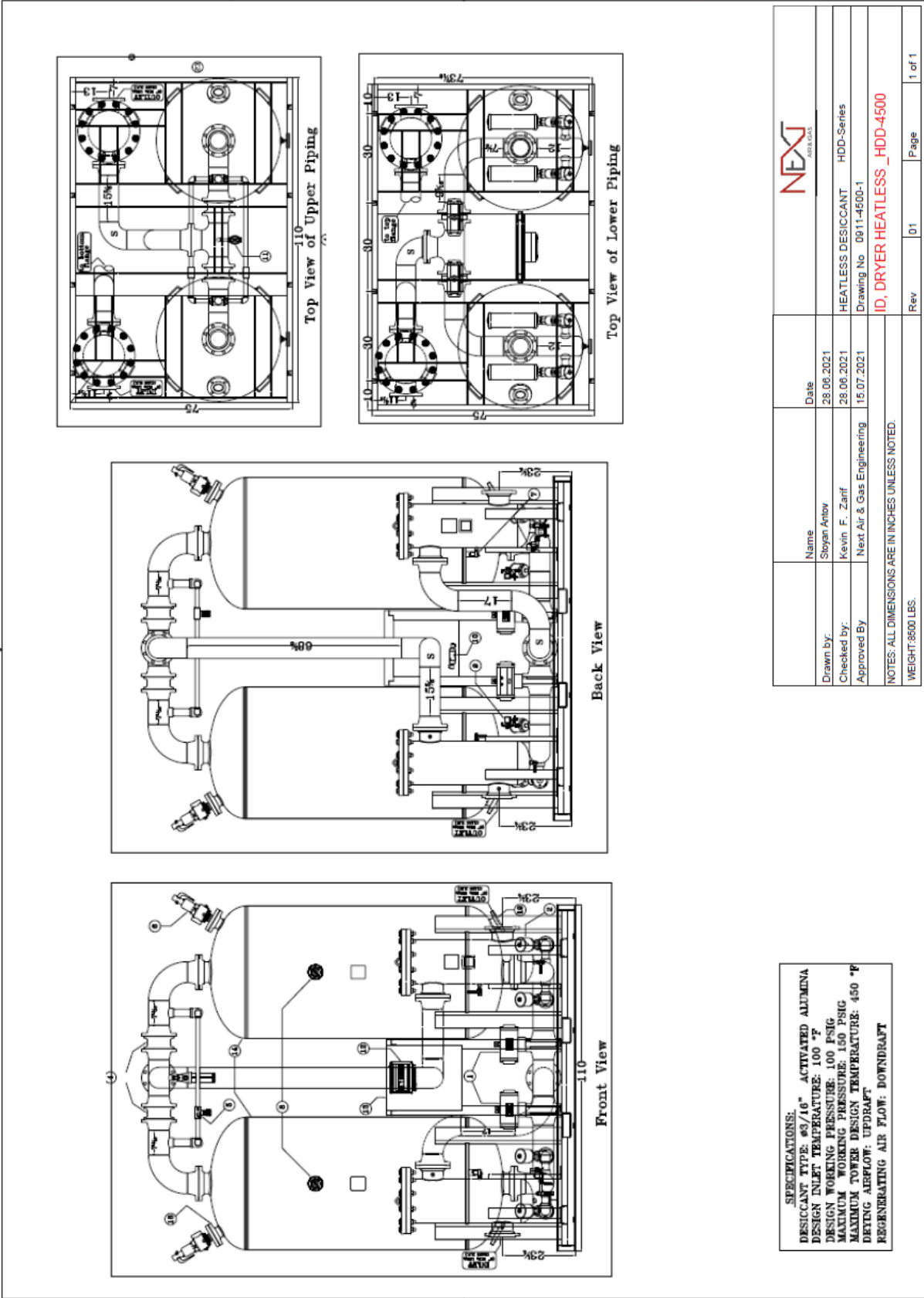
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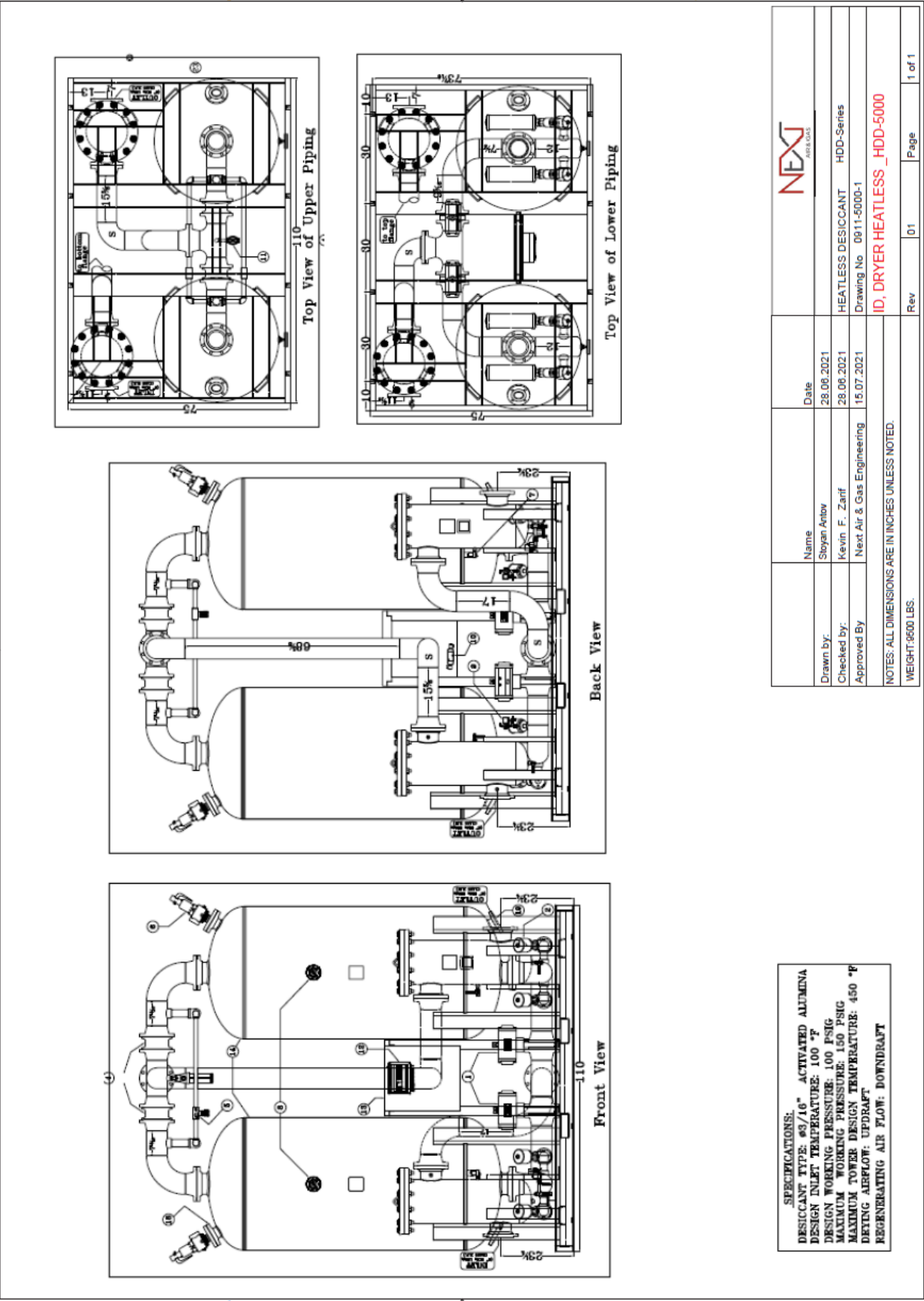
3.34 ID, HDD 4000



3.35 ID, HDD 4500



3.36 ID, HDD 5000



[illegible]

OPTION
SUB-ZERO

SELF REGULATING HEAT TRACE

GFCI

LOAD

LINE

115/1/60 MINIMUM CIRCUIT: 10AMP

SHT1 PLC INPUT
TERMINAL

OPTION
DEW POINT
(DCC/DDPM)

SHT1 PLC INPUT
TERMINAL

V-

45/22/BLK

TB2 45/22/BLK

DEW POINT

4-20ma

S

C+/22/WHITE

NO C+/22/WHITE

V+

46/22/RED

TB2 46/22/RED

OPTION

AFTER FILTER

PRE-FILTER

RTPS

PS1

LTPS

PS2

REMOTE OFF/ON

46

45

31

32

12

11

10

40

SHT1 PLC INPUT
TERMINAL

Remote Start/Stop
Requires a customer
Supplied Relay

TOLERANCES U.S.		TOLERANCES METRIC	
UNLESS OTHERWISE SPECIFIED	AS SHOWN	UNLESS OTHERWISE SPECIFIED	AS SHOWN
FRACTIONS	1/16, 1/8, 1/4, 1/2, 3/4, 1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100	FRACTIONS	1/16, 1/8, 1/4, 1/2, 3/4, 1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100
DECIMALS	0.0005, 0.001, 0.002, 0.003, 0.004, 0.005, 0.006, 0.007, 0.008, 0.009, 0.010, 0.012, 0.015, 0.020, 0.025, 0.030, 0.035, 0.040, 0.045, 0.050, 0.055, 0.060, 0.065, 0.070, 0.075, 0.080, 0.085, 0.090, 0.095, 0.100	DECIMALS	0.0005, 0.001, 0.002, 0.003, 0.004, 0.005, 0.006, 0.007, 0.008, 0.009, 0.010, 0.012, 0.015, 0.020, 0.025, 0.030, 0.035, 0.040, 0.045, 0.050, 0.055, 0.060, 0.065, 0.070, 0.075, 0.080, 0.085, 0.090, 0.095, 0.100
ANGLES	1/16, 1/8, 1/4, 1/2, 3/4, 1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100	ANGLES	1/16, 1/8, 1/4, 1/2, 3/4, 1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100
WELDING DIMENSIONS	AS SHOWN	WELDING DIMENSIONS	AS SHOWN
WELDING DIMENSIONS	AS SHOWN	WELDING DIMENSIONS	AS SHOWN

REVISION

NO.	DATE	BY	CHKD.	APP'D.
1	10/1/00	WJ	WJ	WJ

DRAWING INFORMATION

NO.	DATE	BY	CHKD.	APP'D.
1	10/1/00	WJ	WJ	WJ

WJ, DRAWING HEATLESS DHL-80-5000
PLC/TOUCH SCREEN

SCALE 1:1

SHEET 2 of 2

3.39 HDD- Options -A

Category	Option Code	Description
Alternate Voltages:	ALT-V-1	208-230 Volts / 1 Phase / 50-60 Hz
	ALT-V-2	24 Volt DC
	ALT-V-3	12 Volt DC
	PC	Pneumatic Control
Electrical Enclosure:	N4	NEMA 4 ELECTRICAL ENCLOSURE
	N4X-P	NEMA 4X POLYCARBONATE ELECTRICAL ENCLOSURE
	N4X	NEMA 4X STAINLESS STEEL ELECTRICAL ENCLOSURE
	N7	NEMA 7 EXPLOSION PROOF ELECTRICAL ENCLOSURE
CONTROLLER:	ALT-C-1	NHDC-2201 (DIGITAL CONTROLLER)
	ALT-C-2	NHDC-2300 (TOUCH SCREEN CONTROLLER) -STANDARD
	ALT-C-3	NHABC (ALLEN Bradley Interface)
	ALT-C-4	NHSC (Siemens Interface)
Condensate Drains:	EFD	EXTERNAL FLOAT DRAIN
	EZLD	ELECTRONIC ZERO LOSS DRAIN
	PZLD	PNEUMATIC ZERO LOSS DRAIN
	HPTD	HIGH PRESSURE TIMER DRAIN
DEW-POINT & DIGITAL MONITORING:	DCC+DDPM	DEMAND CYCLE CONTROL
	DDPM-40	DIGITAL DEW POINT MONITOR -(40F)
	DDPM-100	DIGITAL DEW POINT MONITOR -(100F)
	FTS	FAILURE TO SWITCH ALARM
	DCA	DRY CONTACT ALARM
	ESS	EMERGENCY STOP SWITCH

3.40 HDD- Options -B

Category	Option Code	Description
BYPASS	3VBP	THREE VALVE BY PASS
	9VBP	NINE VALVE BY PASS
FILTRATION	DPF	DUAL PRE FILTER (1 UM , .01 UM)
	SP-F	SPECIAL FILTER CONFIGURATION
	FS	FILTER SKID
PACKAGES	LAP	LOW AMBIENT PACKAGE
	SZ	SUBZERO PACKAGE
	RS	RENTAL SKID
CONSTRUCTION	NYM	NO YELLOW METAL
	SP-DIM	SPECIAL DIMENSION
	SP-FLTR	CANDIAN STANDARDS ASSOCIATION
	CSA	CANADIAN REGISTRATION NUMBER (3000+ CFM)
	BTS	BUILT TO SUIT
	IOPG	INLET-OUTLET PRESSURE GUAGE
	IOTG	INLET OUTLET TEMPERATURE GUAGE
	TTG	TANK MOUNTED TEMPERATURE GUAGE
	VMI	VISUAL MOISTURE INDICATOR
	SST	STAINLESS STEEL CONTROL AIR TUBING
	CR	CONTROL LINE PRESSURE REGULATOR
	EPH AC	ELECTRICAL PANEL HEATER
	AC	AFTER COOLER
	TAG	STANDARD STAINLESS STEEL ID TAG
	MGP	MARINE GRADE 2 PART EXPOXY PRIMER & PAINT

Section 4

Installation

The dryer should be installed at a level location that is selected to provide easy access to all parts of the system to ensure future ease of service.

Ensure that the inlet and outlet connections to the dryer are made with correct flange size and pressure rating.

Ensure that the electrical service to the dryer is suitable for the equipment requirements as listed in *Section 3.6* on page 16 of this manual.

It is recommended that the dryers “regeneration air outlet connection” or “purge exhaust connection” be piped to the outside of the building. This ensures that the moisture adsorbed in each drying period is not released into the building as the equipment operates. Since the regeneration process is at a very low pressure it is critical that the regeneration air outlet piping is adequately sized. This will prevent “back pressure” that reduces the delivery volume and consequently the regeneration efficiency. A good rule of thumb that governs the pipe size used is as follows:

- Up to 10 ft / 3 m long use the same size pipe as the regeneration air outlet connection.
- Up to 20 ft / 6 m long use one size bigger pipe.
- Up to 50 ft / 15 m long use two sizes bigger pipe.

It is important that the operating conditions listed in *Section 3: Specifications* are observed. Failure to do so may result in premature failure of the desiccant due to low operating pressure or high inlet temperatures. Do not place dryers into service until they have been fully regenerated on both vessels, the operating cycle in the PLC has been verified and the system is at the correct operating pressure.

If the system pressure cannot be maintained in the adsorption vessel during drying a system pressure holding valve is required to protect the dryer from high velocities which are the result of low service pressure. The pressure holding valve must be installed downstream of the dryer system. Failure to maintain the correct operating pressure may lead to dew point failure.

If there are any changes in the operating conditions of the system from those listed in *Section 3: Specifications*,

please contact the customer service department for advice on any necessary system adjustments.

In addition to the general mechanical construction procedures and local regulations, the following instructions need to be emphasized:

Only authorized, trained and skilled engineers should install the compressed air dryer.

Safety devices, protecting covers, or insulation on dryers are never to be dismantled or modified. Each pressure vessel installed outside the dryer with air above atmospheric pressure must be fitted with the required pressure relief safety valves.

4.1 Installation Site

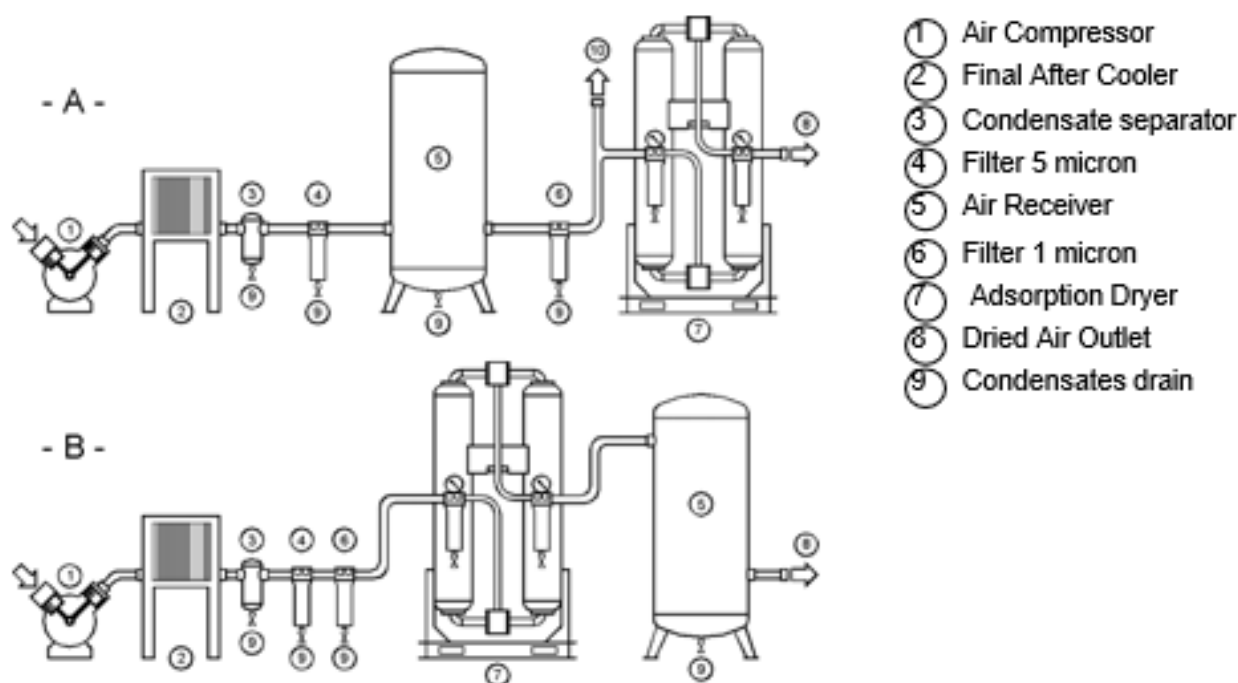
Care is required in selecting the installation site, as an improper location could jeopardize the proper operation of the dryer.

- This unit is not suitable to be used in an explosive atmosphere, where the risk of fire could exist, or in the presence of gaseous or solid polluting material.
- Do not use water to extinguish fire in the dryer or in the surrounding area.
- Dryer’s noise level can be higher than 85 dBA. It is mandatory to install the machine in a dedicated area where people are not normally present. The installer is responsible for the correct installation of the dryer, to prevent noise propagation to the nearby work environment. The installer and the user are also responsible for posting signs near the site.

The machine operator must wear protective equipment. Each additional operator must select the proper PPD (Personal Protection Device), ear protection (earmuffs, ear canal caps or earplugs), and observe caution to prevent any danger.

4.2 Minimal Installation requirements.

- Select a room which is dry, free from dust, and protected from atmospheric disturbances.
- The supporting area must be smooth, level, and able to hold the weight of the dryer.
- Minimum ambient temperature 34°F.
- Maximum ambient temperature 122 °F.
- Allow at least a clearance of 1 m on each side of the dryer to facilitate possible maintenance operations.
- Installation of the dryer does not require the dryer being anchored to the mounting surface but maybe by local codes for safety reasons.



- The dryer is supplied with a 0.01-micron filter on the inlet and a 1-micron filter on the outlet. It is recommended to install both 5 micron and 1-micron filter before the dryer, to protect the life of the inlet filter.
- Type A installation is suggested when the compressed air treated from the dryer is only a part of the total flow rate of the compressor; or when the compressor operates at reduced. Intermittence and the total consumption equal the compressor flow rate.

4.3 Connection to the compressed Air System •

Qualified personnel are required to perform all machine operations that are suggested in this manual. Never operate under conditions where the factory air is under pressure.

- The user is responsible to ensure that the dryer will never be operated with pressure exceeding the nominal values. Eventual over-pressure could be dangerous both for the operator and the machine.
 - The air temperature and the amount of air entering the dryer must comply with the limits reported on the data label. If the air is not drying at temperatures exceeding 140 F, the installation of a refrigerated dryer could result as a necessity. The cross section of the connecting piping must be free from dust, rust, and other impurities. In addition, the flowrate of the dryer must be consistent. Protective measures must be considered while the dryer depresses, as vibration connecting pipes is recommended to insulate the dryer from possible vibrations originating from the line (flexible hoses, vibration damping fittings, etc.). could occur during operation. To reduce the vibration during operation, the use of

4.4 Electrical Connection

- The connection to the main switch, which is to be carried out by qualified personnel, must comply with local rules and laws.
- Before connecting the unit to the electric power, verify that the voltage and frequency of the supplied power corresponds to the data plate of the dryer.
- In terms of voltage, a $\pm 5\%$ tolerance is allowed. The dryer comes with a power source connecting cable already installed (6 ft).



4.5 Condensate Drain

- The condensate is discharged at the same pressure of the air entering the dryer.
- Never point the condensate drain jet towards anybody.
- Connect and properly fasten the condensate drain to a collecting plant or container.
- The drain cannot be connected to pressurized systems.
- Do not dispose of condensate in the environment.
- The condensate collected in the dryer contains oil particles released in the air by the compressor. Dispose of the condensate in compliance with local rules.
- We suggest installing a water-oil separator which can be used to convey all the condensate drain coming from compressors, dryers, tanks, filters, etc.

4.6 Qualified Service Personnel

- A) Maintenance and repairs should only be performed by a professional when the air dryer is shut down and depressurized and when the main power switch is turned off.
- B) Use only the appropriate tools for maintenance and repair.
- C) Before dismantling a part under pressure, disconnect the pressure sources and depressurize the system.
- D) Proceed carefully during maintenance and repair. Prevent dirt from entering by covering parts and orifices with a clean cloth, paper or tape. A receiver should never be welded or modified in any way.
- E) Never leave tools, loose parts, or cleaning rags in or on the air dryer.
- F) Before returning the dryer into service, check the setting of the control and safety devices as well as the pressure and the temperature of the compressed air circuit.

Section 5

Operation

5.1 General Operating Principle

The HDD desiccant dryer series are fitted with two pressure vessels, positioned parallel to one another, and filled with adsorption material (3/16") activated alumina as standard). While the compressed air is dried in one tower, the saturated desiccant is regenerated in the second. A minimal portion of the treated air is used for the regeneration process and expelled along with the condensate, through the silencers.

- The saturated inlet air is cycled through each of the two desiccant beds in an alternating sequence where one bed is on-line at full line pressure and flow, adsorbing the water vapor. This is the drying bed.
- The other bed is then considered to be in an off-line state at atmospheric pressure and is being regenerated by a depressurized portion of the dried, treated outlet air (purge air). This is the regenerated bed.
- The purge air is routed from the dry outlet air through the purge flow control valve, desiccant bed, purge exhaust valve and finally exhausted to atmosphere through silencers to finish the regeneration process. Purge air consumption is generally the highest cost involved with operating a heatless adsorption dryer and is non-recoverable. Therefore, the air system where the dryer is installed must account for this usage.
- Just before the freshly regenerated bed is brought to an on-line state to become the drying bed, it is slowly pressurized from atmospheric pressure up to line pressure. This is the re-pressurization step that prevents desiccant bed fluidization (bed lifting) and dusting. The desiccant beds will now switch where the fresh desiccant bed is now drying, and the saturated bed is now regenerating.

5.2 Cycle Description

- **(Stage1:)** The right tower inlet valve is opened, and it starts to dry the saturated

compressed air. The left purge exhaust valve is opened, depressurizing the left tower. As the wet compressed air flows through the right tower, the desiccant bed absorbs the moisture molecules, and the dry compressed air exits from the right tower and flows downstream. A small portion of this dry air (termed "Purge Air") is redirected towards the left tower (flow controlled by the re-pressurization Valve). This compressed purge air expands to near atmospheric pressure in the left tower, thereby increasing its moisture absorbing capacity. As this expanded dry air flows through the left tower, it absorbs the moisture from the desiccant bed and exits the left tower into the atmosphere through the purge solenoid valve and the purge exhaust muffler. At the end of this stage, the left tower desiccant bed will have completely regenerated (i.e. completely free of H₂O molecules) and is ready for adsorbing moisture from the incoming wet compressed air.

- **(Stage 2:)** The left tower purge solenoid valve is closed, and the left tower is re-pressurized to line pressure. Once it is re-pressurized, the left tower is ready to start the drying process.
- **(Stage 3:)** The left tower inlet valve is opened, and it starts to dry the wet compressed air. The right tower inlet valve is closed, and the right tower purge valve is opened. This process depressurizes the right tower. Now, as the dry air exits the left tower, a small portion of this dry air (termed "Purge Air") is redirected towards the right tower (flow controlled by the re-pressurization valve). This compressed purge air expands to near atmospheric pressure in the right tower, thereby increasing its moisture absorbing capacity. As this expanded dry air flows through the right tower absorbs the H₂O from the desiccant bed, exhausting it through the exhaust muffler. At the end of this stage, the right tower desiccant bed will have completely regenerated...

- (i.e. completely free of moisture) and is ready for adsorbing moisture from the incoming wet compressed air.
- **(Stage 4:)** The right tower purge solenoid valve is closed, and the right tower is re-pressurized to line pressure. Once it is re-pressurized, the right tower is ready to start the drying process.

This process is termed as one cycle, and it continues automatically without any need for user intervention.

***PLEASE NOTE:** The left and right of the dryer is from the perspective of the operator standing in front of the dryer (the controller side)

***PLEASE NOTE:** The desiccant material, if contaminated from lubricant oil, loses its absorption property. Moreover, during operation, the desiccant can release solid particles (powders) particularly abrasive and extremely damaging for the final users.

5.3 Sequence of Operation

- The OFF / ON switch is in the center of the electrical enclosure of the controller. The OFF / ON switch must be turned to the ON position. the dryer to operate.
- Turning ON the ON/OFF switch will initiate the controller and it will follow its operating sequence automatically. Every action of the dryer is displayed on the interactive touch display.
- When the power switch is turned ON, the dryer pressurizes both the towers for approximately 60 seconds. During this time both the Purge solenoid valves are closed, and the compressed air enters both the towers until the line pressure is reached.

5.4 Tower Regeneration

- The right tower starts to dry the compressed air. After approximately 120 seconds, the left tower purge valve opens, and the compressed air is released into the atmosphere from the left tower. Upon depressurization, the left tower starts to regenerate (it can be 2 minutes, 5 minutes or 7.5 minutes depending on the cycle time).
- At the end of the regeneration cycle, the left tower purge exhaust valve is closed, and the re-pressurization

valve/purge adjustment valve is opened for approximately 55 seconds to repressurize the left tower.

- After re-pressurization, both the towers are at line pressure and the left tower goes into a standby mode for 5 seconds during which the optional pressure switch indicator is activated as a secondary check before switching towers.
- Upon successful re-pressurization and pressure switch activation, the towers are switched. Now the left tower starts to dry the compressed air.
- The right tower purge exhaust valve is opened, the right tower depressurizes, and the regeneration of the right tower commences. The moisture laden purge air is dispensed into the atmosphere via the purge exhaust valve and muffler. The regeneration time (it can be 2 minutes, 5 minutes or 7.5 minutes depending on the cycle time).
- At the end of the regeneration cycle, the right tower purge exhaust valve is closed, and the re-pressurization valve / purge adjustment valve is opened for approximately 55 seconds to repressurize the right tower.
- Upon successful re-pressurization of the pressure switch activation, the towers are switched. Now the right tower starts to dry compressed air while the left tower is regenerated, and the cycle continues.
- If the optional Energy-Save module has been installed on the machine, the controller continuously monitors the dew point. If the dried compressed air is below the set dew point, the drying continues in the same tower while the other tower is in standby mode. The dew point standby mode always begins after the regeneration of the offline tower and re-pressurization is complete. When the dew point starts to climb and crosses the set-point, then the controller switches to standard cycle time and the towers switch and the drying cycle continues in the normal model.

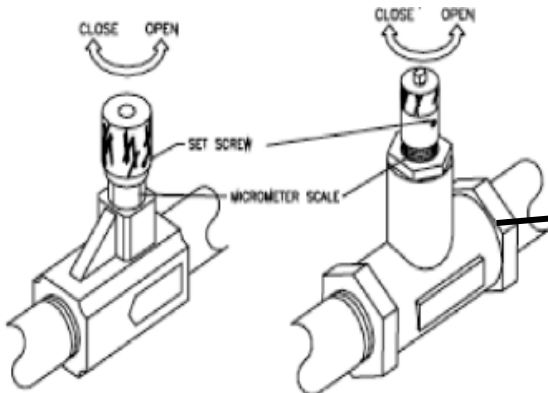
5.5 Operating Conditions

- Maximum working pressure 175 PSIG (12 Bar) for higher pressure contact factory.
- Minimum working pressure 80 PSIG (5.5 bar)
- Maximum inlet temperature 120 OF (49 OC)
- Minimum ambient temperature: 34 OF (1.6 OC) for lower ambient temperature contact factory.

5.6 Valve Setting

- The purge flow control valve must be set to match the inlet pressure of the dryer. The valve must be opened to

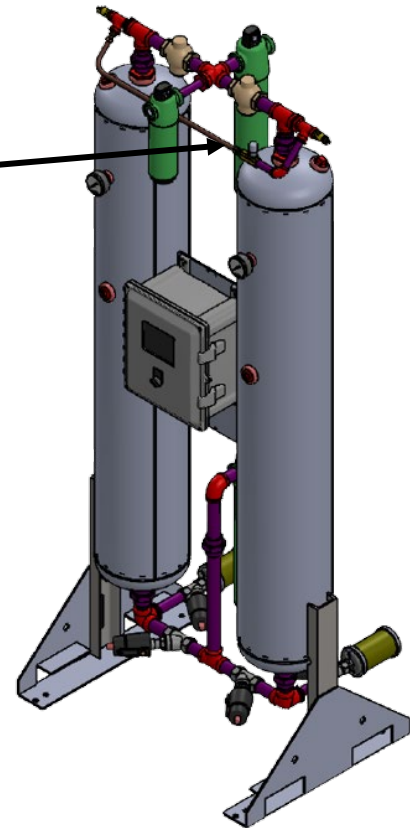
- the corresponding number of turns referenced in the table below.
 - ⇒ Always base the pressure adjustment on the lowest operating pressure of the system
 - ⇒ The initial setting from factory is for 100 psig operation.
- The procedure for adjusting the purge flow control valve is as follows.



- The knob stem of the valve is numbered, and a complete turn is considered turning the control knob 360° from number to number. The number of turns expressed in the table below is based on the number of turns from the closed position.
 - Loosen the set screw using a flathead screwdriver or Allen head.
 - Turn the purge flow control valve clockwise until the stopping point – the valve is now closed.
 - Turn the purge flow control valve counterclockwise until the setting for the desired operating pressure value is reached – the valve is now open.
 - Tighten the set screw using a flathead screwdriver or allenhead.
- The desiccant dryer uses the adsorption properties of the desiccant material to retain the moisture and prevent it from flowing downstream.
- Cycling regeneration of the towers removes the moisture from the desiccant bed and prepares it for drying for the next cycle
- The twin desiccant towers are identical and are filled with desiccant (Activated Alumina/ Molecular sieve / Silica Gel ...etc.) activated. The cycle time is set during the manufacturing phase (as well as the

.....regeneration nozzle) according to the Pressure Dew Point (PDP)

- However, periodically the Filter Elements and the Desiccant material must be changed to ensure that the dryer provides you with reliable and uninterrupted service and little maintenance. However, periodically the Filter Elements and the Desiccant material must be changed to ensure that the dryer provides you with reliable and uninterrupted service.



5.7 Maintenance:

- The HDD series of adsorption dryers requires very little maintenance. However, periodically the Filter Elements and the Desiccant material must be changed to ensure that the dryer provides you with reliable and uninterrupted service.

Figure 5-7: Maintenance Table

Figure 5-3: Heatless diagram.

	The maintenance operations must be worked out by qualified personnel. Before any intervention, verify that: No part of the machine is powered, and it cannot be connected to the main power supply. No part of the machine is under pressure and that it cannot be connected to the compressed air system.
	The user that works with the machine must wear hearing protection before operating the dryer. Each employee must select a proper PPD (Personal Protection Device) hearing protector. (Earmuffs, ear canal caps, and earplugs) to prevent any uneasiness that could cause a dangerous situation.
Daily	- Check if the inlet filter condensate drain works regularly. - Check the clogging state of the filters by reading the installed differential pressure gauge. - Check that the tower switching operation takes place correctly and in the set cycle times. - Check that the regenerating tower differential pressure gauge indicates 0 bar.
Yearly / 3000 Hours	- Replace the inlet and outlet filter cartridge. - Clean the silencers or if necessary, replace them. - Check if the regeneration drains solenoid valves (PVA and PVB) work regularly. - Check if all screws of the electrical wiring are correctly tightened. - Check and control the operation of the dryer.
Every 2 Years / 6000 Hours	In addition to the programmed maintenance, every year: - Replace the membrane of the regeneration drain solenoid valves (PVA and PVB). - Replace the purge exhaust valves if required. - Check the operation of the dryer after any replacements.
Every 3 Years / 9000 Hours	Replace the adsorption material. The estimated average life of the adsorption material is 3-5 years, with 10-minute cycle times and 3000 hours / year in any case it depends on the quality and temperature of the inlet air and on the correct programmed maintenance.

5.8 Dismantling

- If the dryer is to be dismantled, it must be split into homogenous groups of materials.

Figure 5-9: Parts & Material Table

Part	Material
Desiccant material	Activated alumina or molecular sieve optional
Frame and supports	Carbon steel
Piping	Carbon steel
Towers and diffuser	Carbon steel, stainless steel
Inlet valve	Stainless steel / carbon steel
Filter housing	Aluminum
Filter cartridge	Filtering material, PVC, oil
Solenoid valve	Bronze
Condensate drain	Bronze
Silencers	Aluminum
Safety valves	Brass

Part	Material
Gaskets and o-ring	Graphite, synthetic elastomer
Electric cables	Copper, PVC
Electric parts	PVC, Copper, Bronze
We recommend that you comply with the safety rules in force for the disposal of each type of material. The adsorption material and the filter cartridge contain droplets of lubrication oil. Do not dispose of these materials into the environment but rather deliver / drop off at proper disposal centers.	

5.9 Troubleshooting

No.	Problem	Possible Cause – Suggested Action
1	Moisture in the outlet air	The dryer is switched OFF – Turn it ON.
		The dryer has just been commissioned and the adsorption material can contain humidity – Use the dryer at a reduced flow of approximately 50% for at least two days and verify the correct operations of the dryer.
		The dryer does not perform the switching cycles – Refer to problem “Dryer towers do no Switch”.
		The inlet air is too hot – Restore the nominal conditions.
		The inlet pressure is too low – Verify that the installed regeneration nozzle is for the rated working pressure of the dryer. If you have doubts or problems, please contact your distributor.
		The inlet air flow rate is higher than the rate of the dryer – Reduce the flow rate to rated inlet conditions of the dryer.
		Inlet filter does not drain the condensate – Check the proper operation of the drain timer.
		Electronic timer of the inlet filter drainer is not adjusted correctly – Reduce the drain pause timer.
		The pressure gauge of the tower under regeneration shows a pressure higher than zero / silencers are clogged – Clean or replace them immediately.
		Cycle time on NHDC-2300 Electronic Controller has been modified – Restore the time to recommended timing.
		Desiccant is completely saturated – Either regenerate desiccant completely or replace desiccant.
2	Purge solenoid valves are never activated	Check for electrical supply or on/off switch failure.
		Verify the electrical wiring
		Verify the fuse on NHDC-2300 electronic controller.
		The valve is blocked – Open and clean it.
		The solenoid valve has gone bad – Replace it.
3	Dryer towers do not switch correctly	Solenoid valve PVA and / or PVB are never activated – See specific point.
		Inlet and / or outlet valve is blocked, or inlet solenoid is not working – Carry out maintenance operation.
		Check the purge exhaust mufflers and make sure it is clean – Replace if required.
4	All the inlet air is discharged through the purge exhaust mufflers	The dryer does not perform the switching cycles – Refer to Step 2.
		The purge solenoid valve PVA and / or PVB is blocked – Open and clean it.
		The NHDC-2300 electronic controller always supplies solenoid valve PVA and / or PVB – Check the wiring and replace if necessary.
		The cycle times on the NHDC-2300 electronic controller have been changed – Restore to original settings.
		Regeneration nozzle is clogged – Open and clean it.
5	Liquid at the purge exhaust mufflers	Humidity in outlet air – Refer to “Moisture in the Outlet Air” to resolve the issue.
6	Hi-Dew point	The probe of the Dew Point meter (optional) detects a high dew point, for one of the

No.	Problem	Possible Cause – Suggested Action
7	message is displayed on the NHDC-2300 controller screen	following reasons:
		Humidity at dryer outlet – Refer to “Moisture in the Outlet Air” to resolve the issue.
		The dew point meter has been changed – Ensure that there is a constant flow of air passing through the dew point measuring cell.
		The shuttle valve of the air being supplied to the dew point meter is blocked – Clean and ensure that the dry air flows from the tower when it's drying.
		Verify the electric connection of the probe.
		The probe is broken – Replace it.
		There is an air leak with the pipes and / or joints that connect the equipment – Verify the connections and replace the damaged parts.
		A pipe or a joint which connects the equipment is clogged – Replace it.
8	Alarm light is ON	Filter must be replaced – Check display.
		If optional differential pressure switches are installed on the filters – Replace the filter elements.
		If no switches are installed on the filters, then it means it has been 6000 hours and the filter elements need to be replaced. Replace the element.
		High dew point alarm. When the dew point at the outlet is greater than 33 degrees F, the “Hi dew point” message and the alarm light is turned ON. Refer to “Moisture in the Outlet Air” to resolve the issue.
		The optional pressure switch in the right or left tower has failed. This indicates the corresponding tower has failed to pressurize. Refer to the screen to identify the tower that has not been pressurized. Follow the steps in 2, 3, and 4. Replace the pressure switch if it is found bad.

5.10 Preliminary Start Up

The following points must be observed before operating the air dryer:

Prior to starting the regeneration, the complete installation should be checked over to verify the following points.

1. Are the connections to and from the system inlet and outlet made? Are the correct size and pressure rated connections used?
2. Is the correct electrical service connected to the dryer with a suitably sized Disconnect switch? With the power applied to the dryer it is necessary to verify that the phase rotation of the supply is correct. This is done by “bumping” the blower motor starter and verifying its direction of rotation.
3. With the system outlet valve and bypass valves closed, slowly open the dryer inlet block valve to pressurize the system. Check the complete dryer system for leaks currently. All leaks must be repaired and retested.
4. Pressurize the dryer controls either with an external air supply or pressurize the dryer by slightly opening the dryer's inlet valve. Test the operation of the instrumentation and operation valves by manually advancing the dryer through a complete cycle. Once the testing is complete, fully open the inlet valve.
5. Verify that all instruments and pilot air tubing fittings are tight and that the pilot air service valve is open.
6. With the power on, verify that the PLC is in the “RUN” mode. After a few minutes the regeneration process for vessels “1” and “2” will begin. Observe all operations of these first two cycles and verify the settings of temperature, pressure, and valve operations in the PLC program.

At the completion of the startup procedure, the dryer system is ready to dry the process air. Slowly open the system outlet valve to pressurize the downstream system. Ensure the bypass valve is closed prior to operating the dryer.

- Review all safety precautions.
- The dryer connection piping measurements must be selected correctly.
- The dryer connection piping must be adapted to the operating pressure.

- Never operate the dryer at a pressure above the maximum specified on the dryer label.
- The drains should be opened to the atmosphere. If the drains are connected to a pipe / hose, the diameter of the hose / pipe should be large enough to create no back pressure during drain. It is not recommended to reduce the diameter of the hose / pipe to less than the port that is given at the drain outlet of the unit.

The hose / pipe should be always at atmospheric pressure. Back pressure in relevant pipes will result in permanent damage to the drain system and the affect function of the filters and / or dryers.

After starting up and approximately one week of service all process piping flanges and the bolting should be checked for tightness. Thermal cycling may affect some gaskets from the initial bolt torque pre-loading Filtration.

The dryer is equipped with high efficiency filters.

- Inlet Filter – 0.01-micron filtration grade, with differential pressure gauge and electronic timer drain or optional zero loss drain.

Outlet Filter- 1 micron filtration grade, with differential gauge and manual drain. And thus, some bolting may need to be tightened Control Pilot Valves

5.10.5 Inlet Pilot Solenoid Valve

5.11 Equipment Shut down.

The Dryer can essentially be shut down under any “**emergency conditions**” at any time in the cycle. It is advisable to be fully familiar with the dryer and its operation to avoid any possible hazard or injury as the equipment is under pressure and may be hot. When the system is shut down and the power removed, the dryer bypass valve must be opened, and the outlet block valve must be closed to prevent the vessel in adsorption becoming overloaded with moisture.

FOR PLANNED SHUTDOWNS, IT IS RECOMMENDED TO COMPLETE THE REGENERATION PROCESS (HEATING AND COOLING) PRIOR TO STOPPING THE DRYER. This ensures that the full heating and cooling cycle took place and that a fully regenerated bed will be available when the system is re-started.

If a long shut down is planned it is recommended to remove the process flow and fully regenerate both vessels prior to shut down. The equipment should then be left depressurized with the system inlet and outlet block valves closed and the power removed. To place the system in operation, repeat the startup procedure.

5.12 Controller Enclosure

Figure 5-12: Controller Enclosure



5.13 Electrical Enclosure Panel

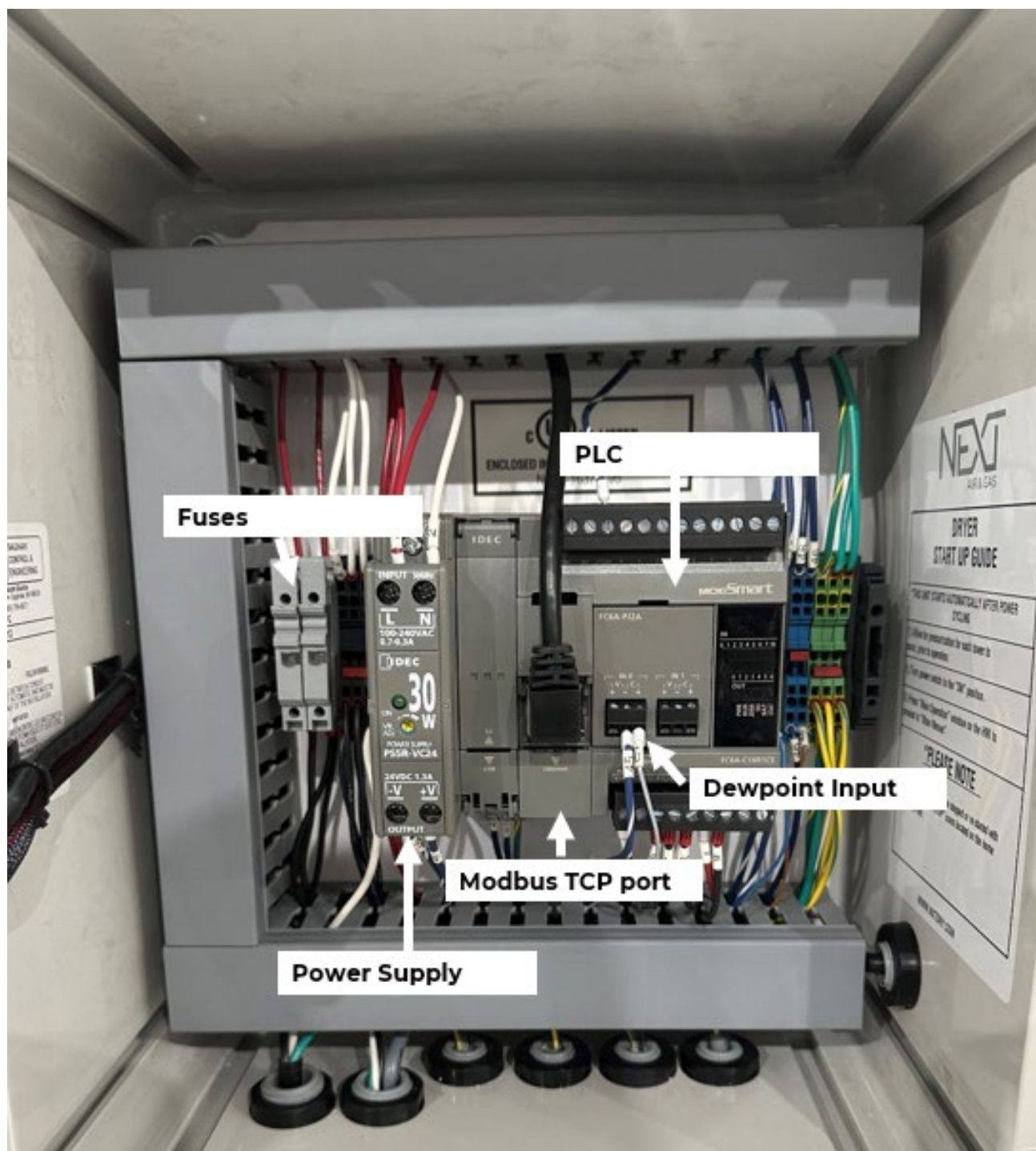
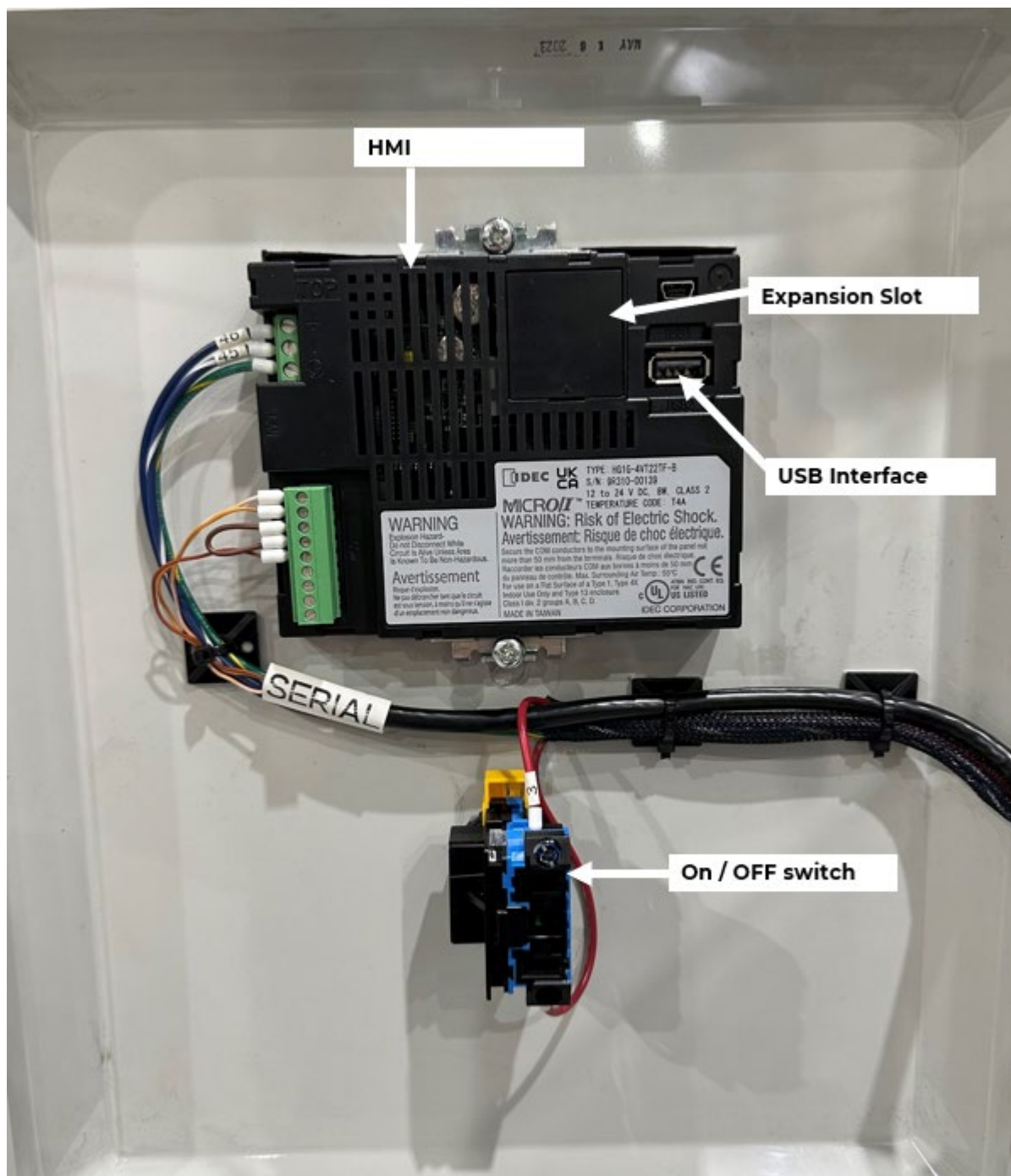


Figure 5-14: Electrical Enclosure — Open



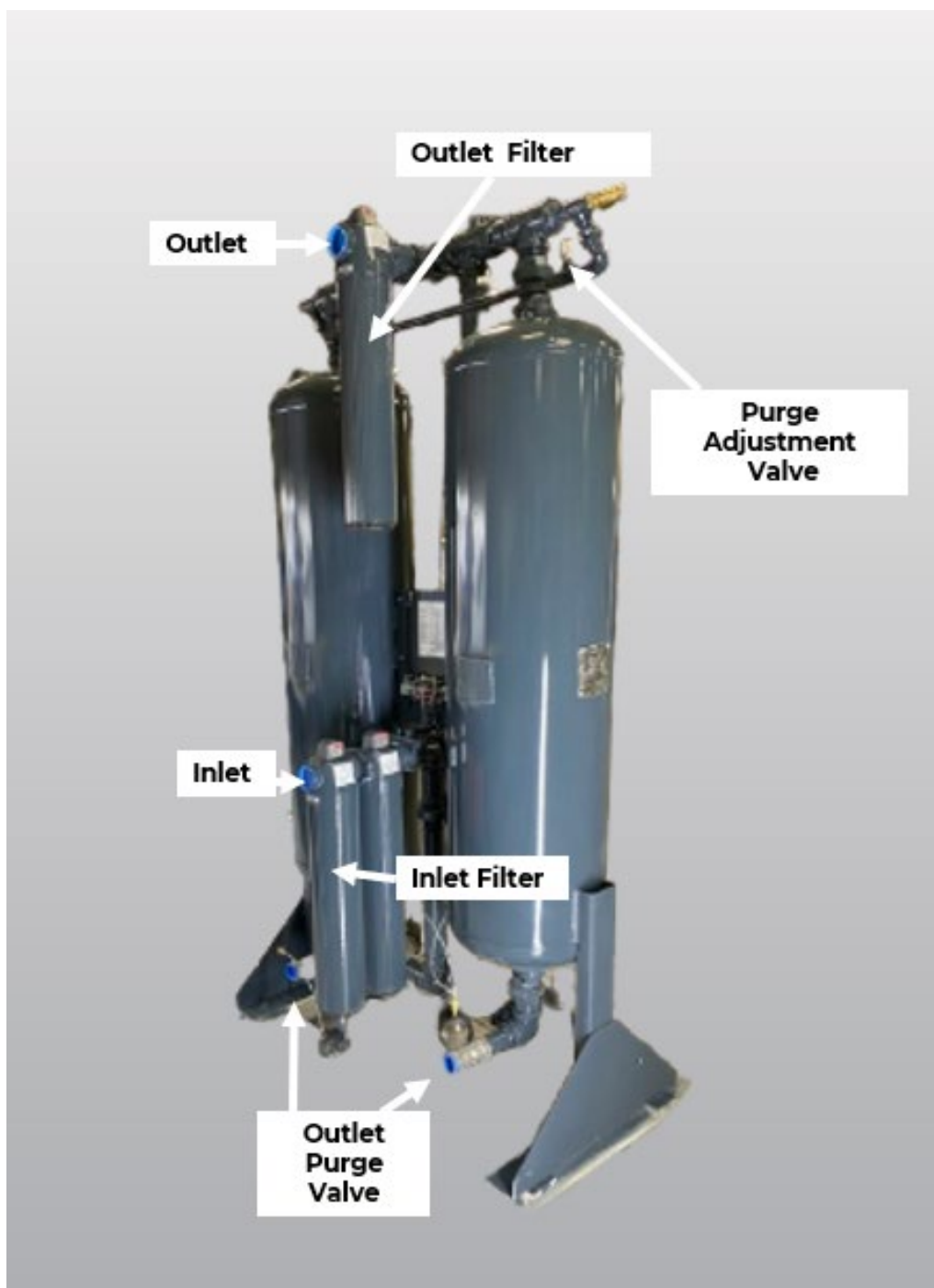
5.14 HDD Front View 80-600

Figure 5.13.2: Front HDD 80-600



5.15 HDD Back View 80-600

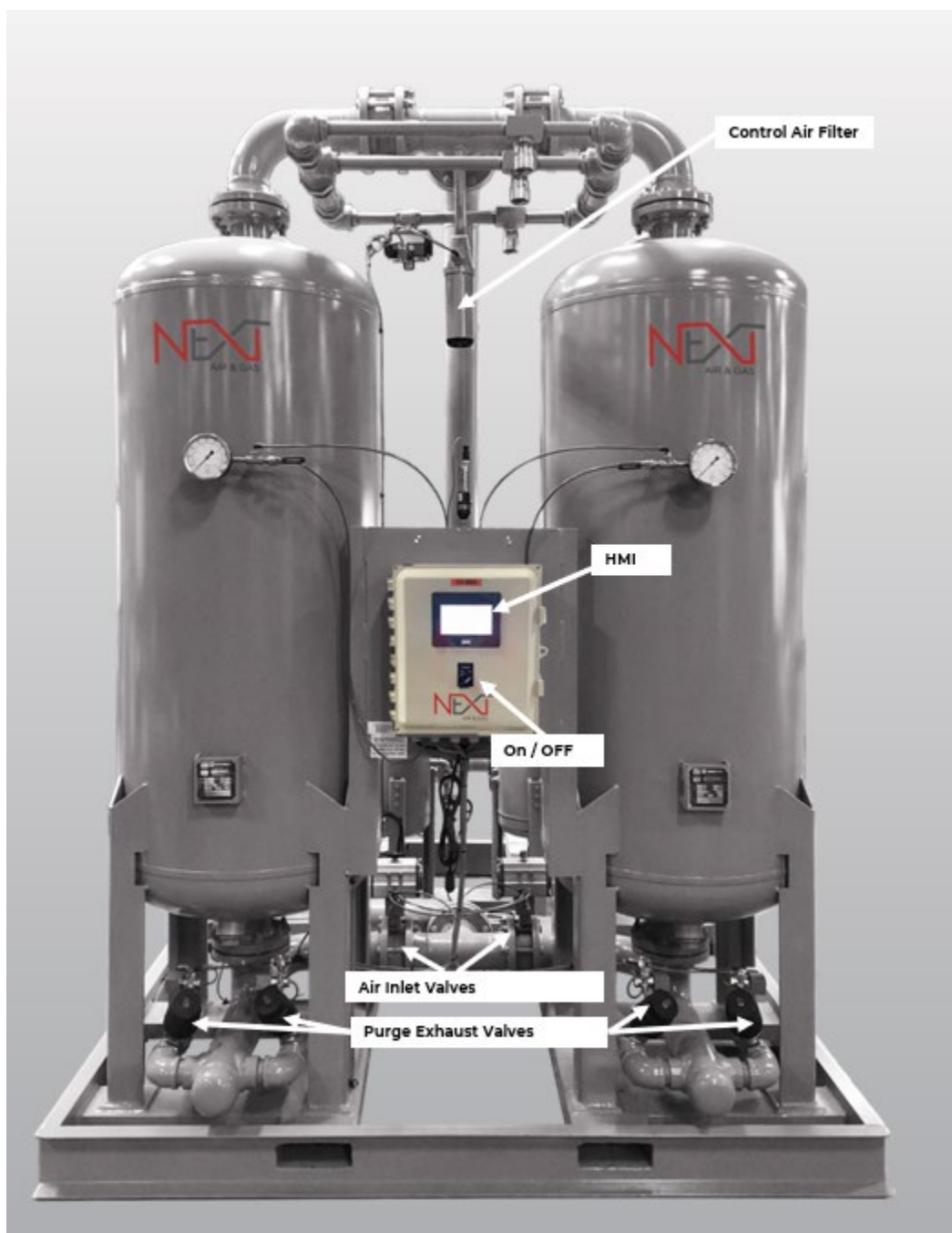
Figure 5.13.3: Rear HDD 80-600



Note: Example shows an optional dual pre-filter package.

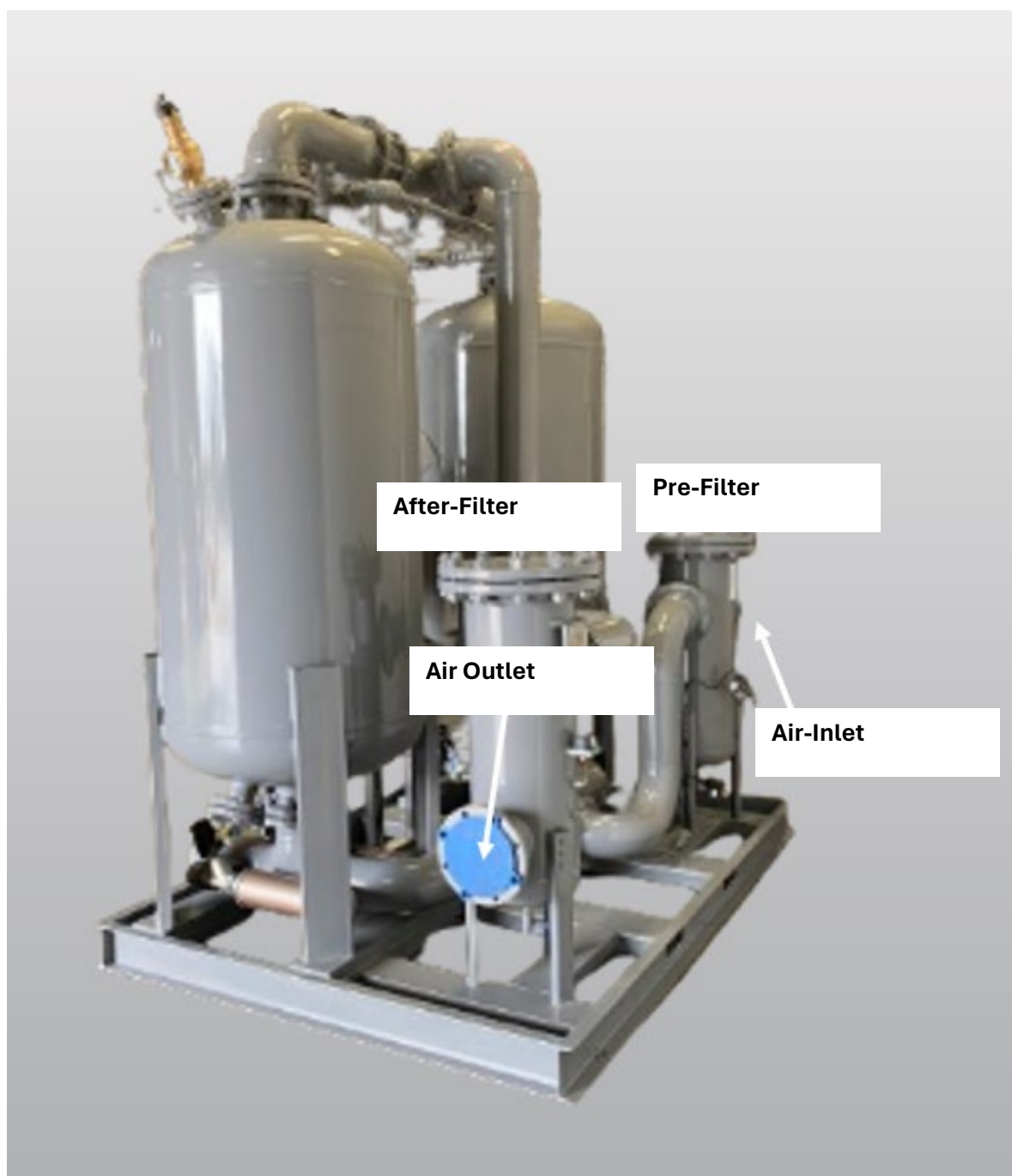
5.16 HDD Front View 800+

Figure 5.16: Front HDD 800-5000



5.12 HDD Back View 800+

Figure 5-17: HDD 800-5000 Back View



Section 6

Controller

6.1 HMI components

the alarm can be reset by pressing the “Alarm Reset” push button on the HMI.

6.1.1 Introduction

The HMI device is designed for maintenance-free operation. The touch screen HMI should nevertheless be cleaned regularly.

6.1.2 Requirements

Use a cleaning cloth dampened with a cleaning agent to clean the equipment. Only use water with a little liquid soap or a screen cleaning foam.

6.1.4.1 Alarm conditions.

Possible alarm conditions:

- High Dew Point Alarm
- Filter Change Alarm
- Failure to switch Alarm (OP+)
- Filter change Alarm

NOTICE

When cleaning the touchscreen, an unintentional response in the controller can be triggered by touching keys.

Switch the HMI device off before cleaning to prevent unintentional responses.

Damage caused by unauthorized cleaning products.

The HMI device may be damaged of com- pressed air, steam jet-air ejectors, aggressive Solvents or scouring powders that are used for cleaning purposes

6.1.3 Procedure

1. Switch off the HMI device.
2. Spray the cleaning solution onto a cleaning cloth.
3. Clean the HMI device, wiping from the screen edge inwards.

6.1.4 Dryer alarm condition

When an alarm condition is active the alarm condition will be displayed on the enclosure door under “Alarm Status” in the text display.

6.2 Introducing the NHDC-2300 controller

The NHDC-2300-TS controller provides the flexibility and power to control a wide variety of devices in support of your automation needs. The compact design, flexible configuration, and powerful instruction set combine to make the 2300 a perfect solution for controlling a wide variety of applications.

The CPU combines a microprocessor, an integrated power supply, input and output circuits, built-in PROF-

INET, high-speed motion control I/O, and on-board analog inputs in a compact housing to create a powerful controller. The CPU contains the logic required to monitor and control the devices in your application. The CPU monitors the inputs and changes the outputs according to the logic of your user program, which can include Boolean logic, counting, timing, complex math operations, and communications with other intelligent devices. The CPU provides a Modbus TCP.

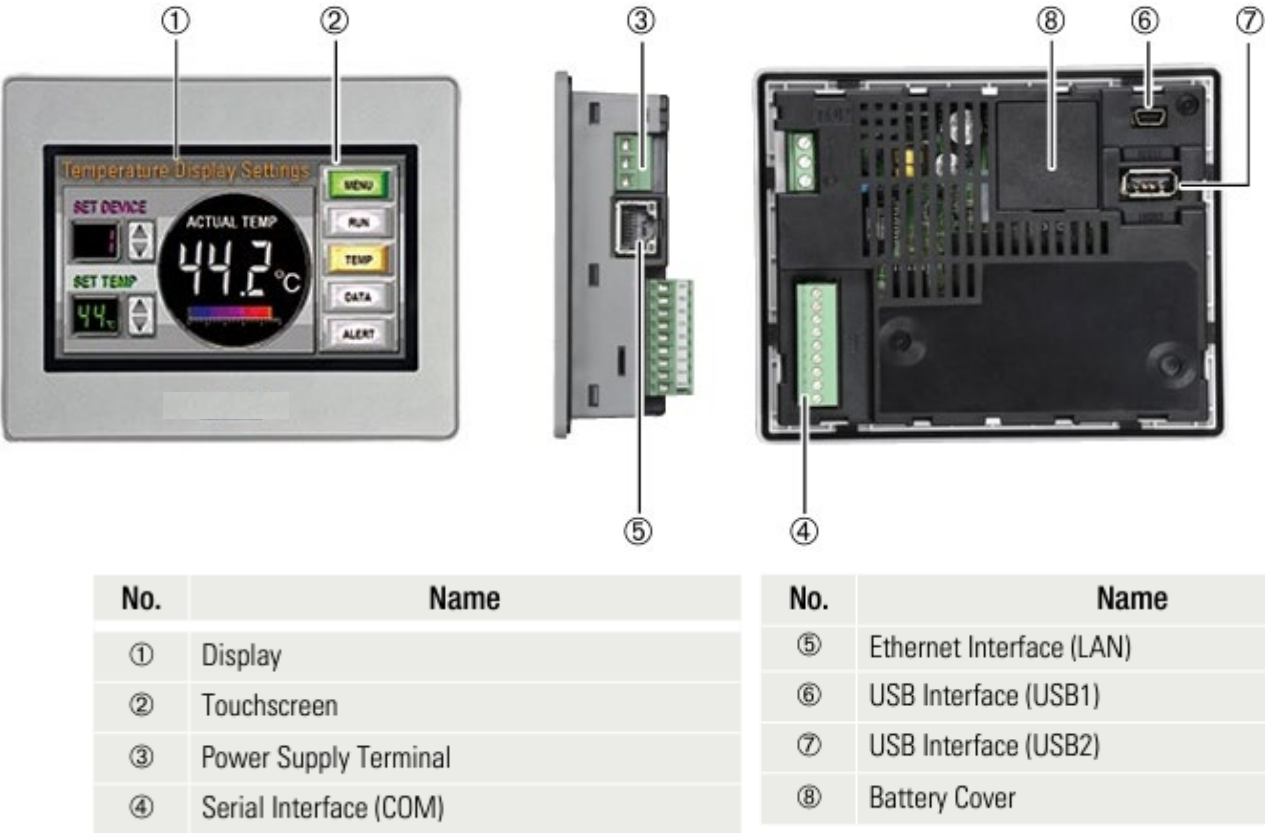


Figure 6-2: NHDC-2300-TS HMI Overview

6.2.1 Modbus address & Alarm Map

MODBUS ALARM MAP

The TCP/IP Modbus location is on 400001 as a 16 bit word.

The designated IP is 192.168.1.10 on port 502, but should broadcast to any IP.

PLC IP is 192.168.1.5

0= RIGHT TANK FAIL TO SHIFT

1= LEFT TANK FAIL TO SHIFT

2=RIGHT TANK FAILURE TO DEPRESS

3=LEFT TANK FAILURE TO DEPRESS

4=RIGHT TANK DEW POINT EXCEEDED

5=LEFT TANK DEW POINT EXCEEDED

6=FILTER NEEDS TO BE CHANGED

7=DEW POINT ALARM SET

15=NO ALARMS ACTIVE

Table 6.2.1: Modbus alarm & address list

6.2.2 IO List

Table 6.2.2: IO list

OUTPUTS				
DESCRIPTION	OUTPUT	SOLENOID	WIRE #	VOLTAGE
ALARM	0		5	120 VAC
RIGHT DRYING	1	1	6	120 VAC
LEFT DRYING	2	2	7	120 VAC
LEFT PURGE	3	3	8	120 VAC
RIGHT PURGE	4	4	9	120 VAC
REPRESSURIZATION	5	7	10	120 VAC
RIGHT DEPRESS	30	6	12	120 VAC
LEFT DEPRESS	31	5	13	120 VAC
INPUTS				
DESCRIPTION	INPUT	WIRE #	VOLTAGE	
REMOTE START STOP	0	I0	24VDC POSITIVE	
LEFT TOWER PRESSURE SWITCH	1	I1	24VDC POSITIVE	
RIGHT TOWER PRESSURE SWITCH	2	I2	24VDC POSITIVE	
PRE FILTER DP SWITCH	3	I3	24VDC POSITIVE	
POST FILTER DP SWITCH	4	I4	24VDC POSITIVE	
ANALOG INPUT (0) 4-20ma				
DESCRIPTION	INPUT	TERMINATION POINT		VOLTAGE
DEW POINT MONITOR	C-	TERMINAL BLOCK #45		24 VDC NEGATIVE
DEW POINT MONITOR	C+	DPM PIN 5		4-20ma
DP MONITOR CONNECTOR	V+	V-	I+	
PIN NUMBER	PIN 1	PIN 3	PIN 5	
CABLE WIRE COLOR	RED	BLACK	WHITE	

6.3 HMI screen overview

- The electrical supply voltage for Next Air & Gas s HDD dryers come standard at 110-115-120 Volts / 1 Phase / 50-60 HZ. The standard electrical supply voltage will indicate 115 volts as standard from the factory.
- **PLEASE NOTE:** that other electrical supply voltages can be optioned to the dryer. The optioned electrical supplies consist of 208-220-230 Volts / 1 Phase / 50-60 HZ and 24-volt DC. Prior to powering up the dryer, Verify the spec options of the dryer and assure that correct voltage is applied.
- Prior to connecting to power, check all electrical connections for tightness and ensure there are no loose or stray wires present. Once the electrical checks are completed, a qualified electrical technician may proceed to power up the dryer. Proceed to the following instructions,
- Turn the dryer OFF/ON switch to the ON position. Once the OFF/ON switch is in the ON position the Next Air & Gas ID screen shown in (Figure.4.1) this will appear during the boot up process of the program.

Figure 6-3: HMI screen overview



- Once the boot screen is present- Touch the interactive display to pull up the home screen

6.4 First start up.

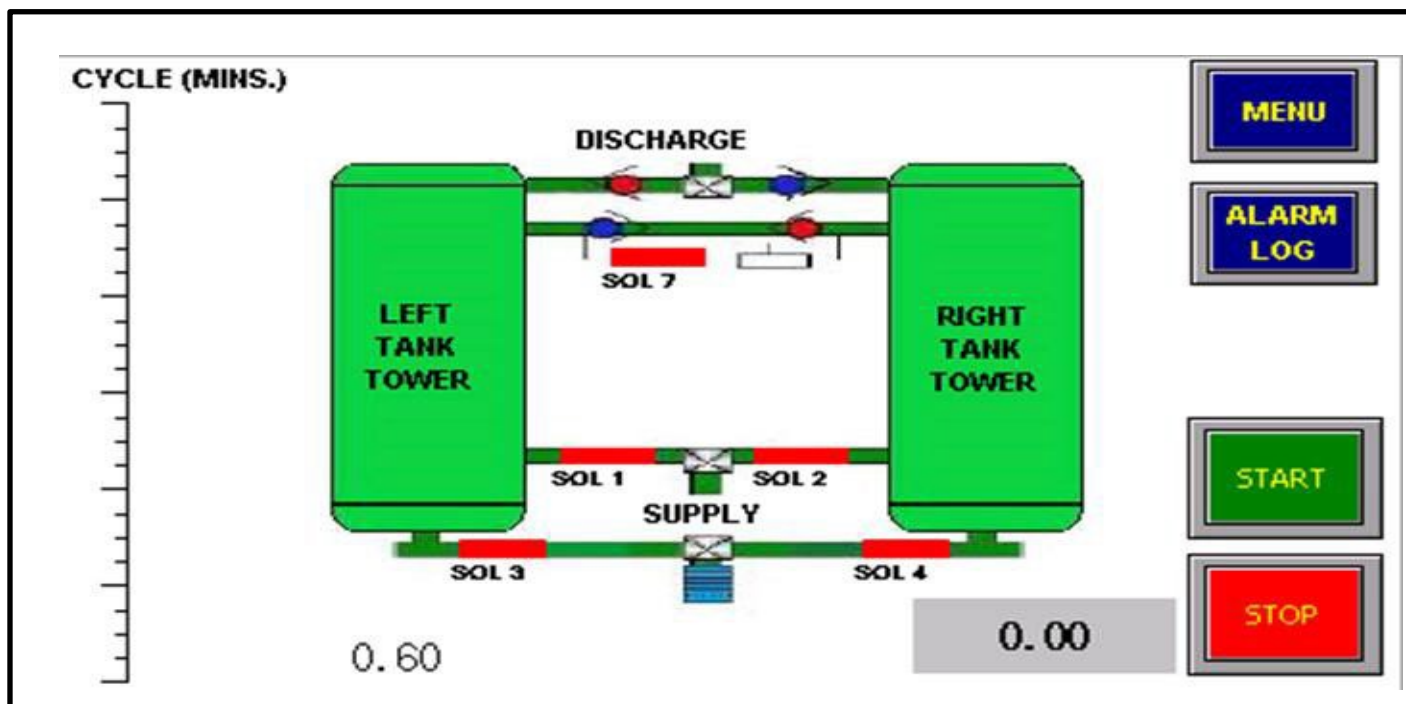


Figure 6-4: Home initial startup Screen 1

6.4.1 Pressurizing

- Pressing the start button on the home screen will initiate the program to start pressurizing. The pressurization screen will pop up and display for a 60 second period.
- When 60 seconds expires, the Controller home screen will be displayed.

PLEASE NOTE: This Pressurizing screen will only appear during start and not during normal operation.

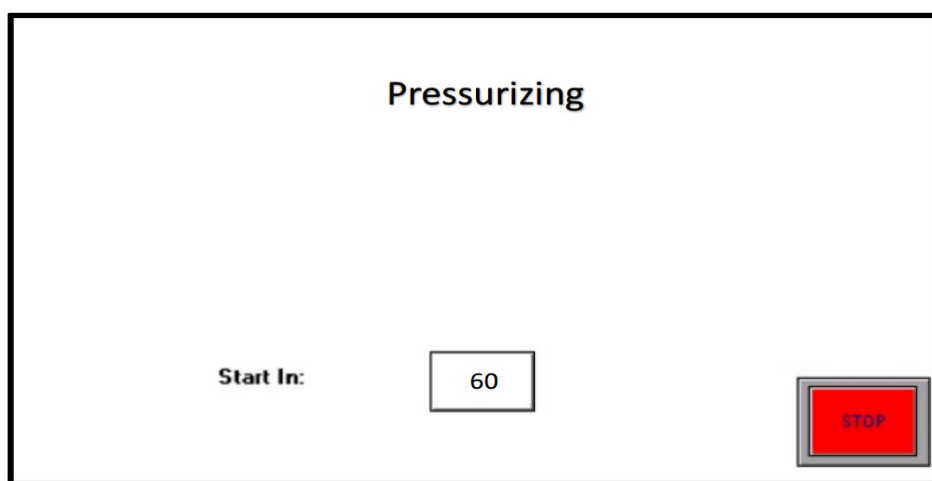


Figure 6-4.1: Pressurizing Screen 1

6.4.2 Home Screen

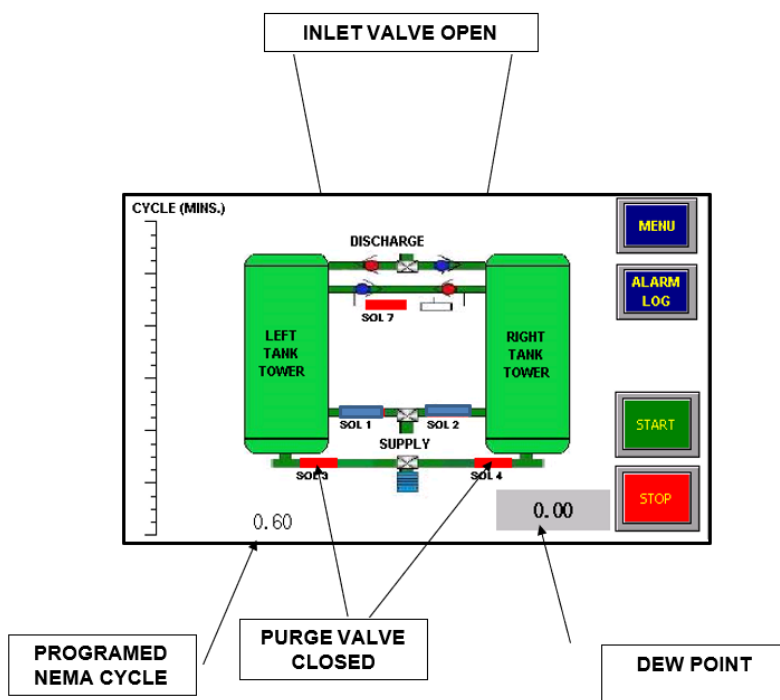


Figure 6.4.2: Home Screen 1

- A timer is located at the bottom of the screen to the left of center. This is the time spent in the NEMA cycle.
- The cycle timer is displayed in seconds and hundredths of seconds (0.00). The Graph on the left edge of the screen is a bar graph indicating the time expired in the current cycle.

6.4.3 Menu Screen

- The Menu button in the top right corner of the “Home Screen” provides access to the Menu screen.

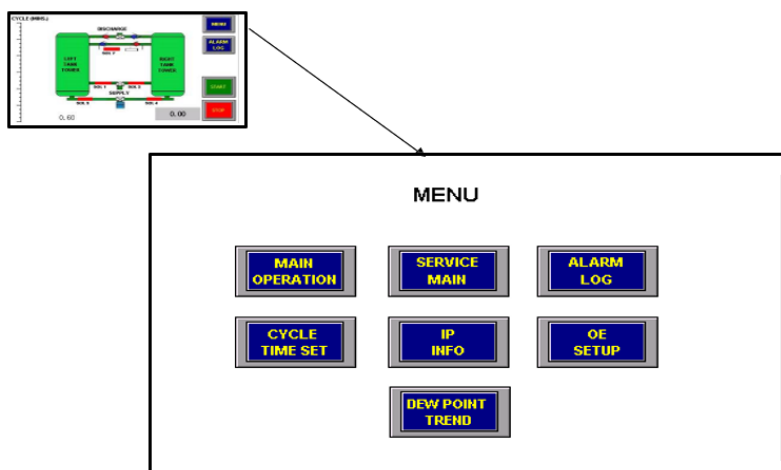


Figure 6-4.3: Menu Screen

6.4.4 Service / Login Screen

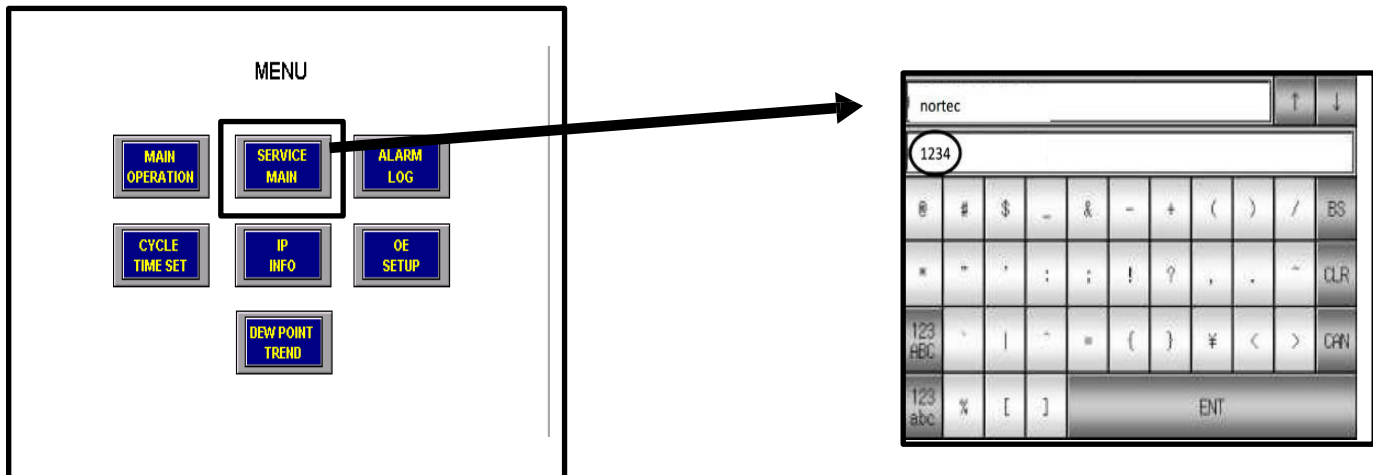
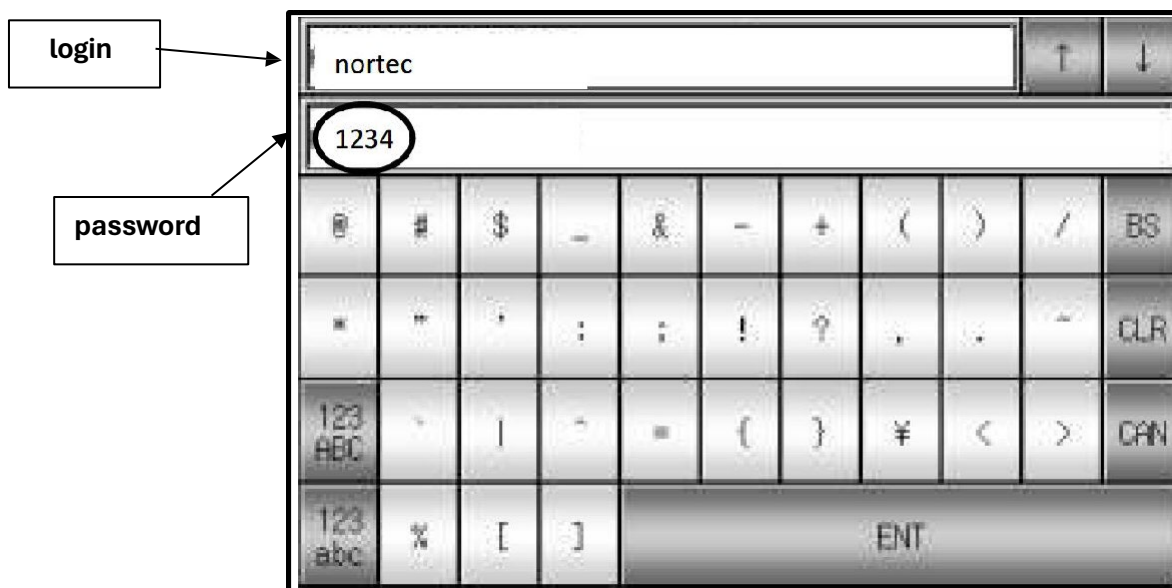


Figure 6-4.4: Service Screen

- Press the Service-Main button to display the log in screen.
- Once the *Service Main* button is pressed the login dialog box will appear. The Login is "Next " and will auto fill. Input "1234" as the password. Then press the enter button.

Figure 6-4.4: Login Screen



6.4.5 Service Main

- The **"Service Main"** screen will appear after the correct password is entered.

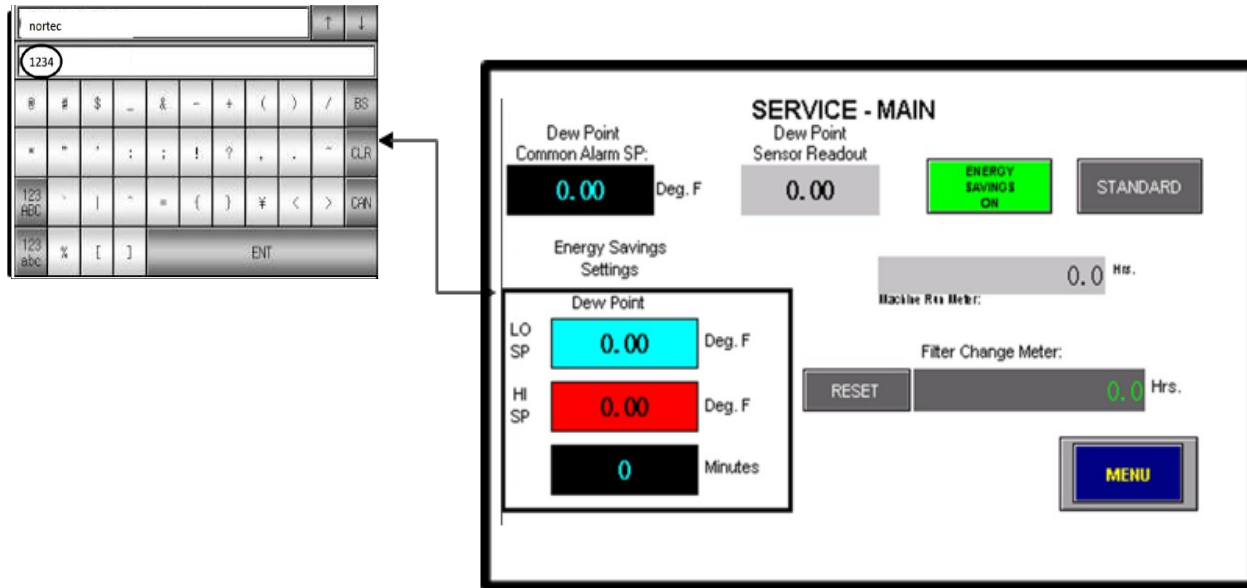


Figure 6-4.5a: Service Main Screen-1

- As previously stated, once the correct login and password is entered the **SERVICE MAIN SCREEN** will appear.

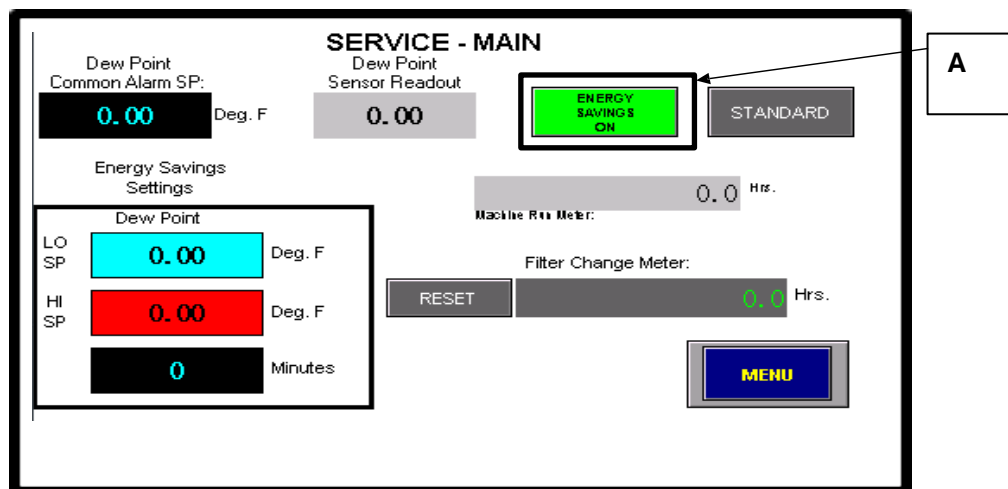


Figure 6-4.5b: Service Main Screen-2

- The Energy Savings button is highlighted showing that it can be changed (indicated by A).

Please Note: If the dew point option is not optioned on your dryer, this button will not be operational as it will have no function, therefore the *Dew Point Sensor Readout* icon will not appear.

- The message displayed on the Energy Savings button indicates the current state that the function is operating in.
- "Energy Savings ON" indicates the controller is operating in DCC mode. When the button displays "Energy Savings OFF" the DCC mode is off.

- The dew point will continue to be displayed in both modes of DCC operation. The reading will also be displayed on the "Home Screen" regardless of Energy Savings Mode.

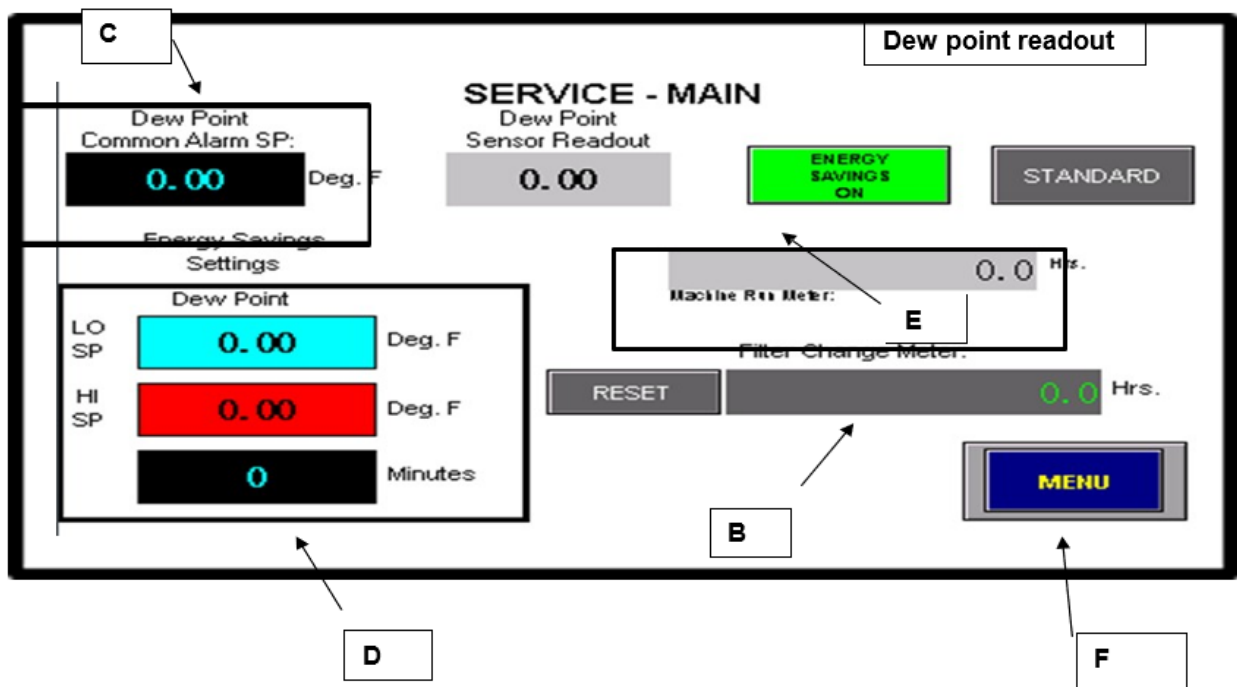


Figure 6-4.5c: Service Main Screen-3

- (B.) FILTER CHANGE METER** -The *Filter Change Meter* reset is located in the lower center of the screen. Pressing the reset button will reset the hour meter to 0.0 from the time elapsed. The change filter warning will be displayed when this meter reaches 6000 hours.
- (C.) Dew Point Common Alarm SP** -The *Service-Main* screen also includes fields that allow the setting of: Dew Point Common Alarm SP - This alarm should be set for the customer required dew point high limit. (Indicated in Figure 5C)
- (D.) "LO SP" (low setpoint)** - This is the dew point setting that puts the dryer in dew point standby.
- (D.) "Hi SP" (high setpoint) and Minutes** - This is the dew point setting that brings the dryer out of the dew point standby. Minutes - The setting in this field determines the maximum time the dryer will stay in dew point standby. When this time expires (factory set 60 min) if the dew point reading is still below the "LO-ST" the dryer will operate in the timed mode for 1-1/2 cycles prior to going back to the dew point standby mode. (Indicated in Figure 5D)
- (E.) Machine Run Meter** - "Machine Run Meter" that is displayed in the Service-Main screen and represents the dryer's operation time. This time is an accumulated operating time over the life of the dryer. The hour meter cannot be reset. (Indicated in Figure 5E)
- MENU BUTTON**- Pressing the Menu button will take the operator back to the Menu screen.

6.4.6 Alarm Log

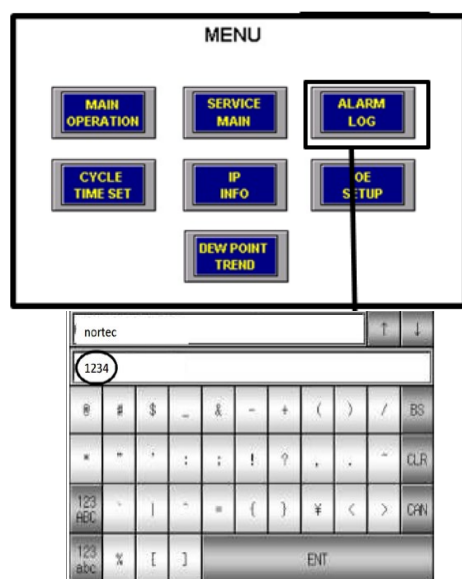


Figure 6-4.6a: Alarm Log access Screen

- **ALARM LOG-** The Alarm Log button will take you to a list of past alarms.
- When this button is pressed, the operator will be directed to input the login password to access the Alarm Log screen.
- Once the username and password are entered, the alarm log will show on your display.

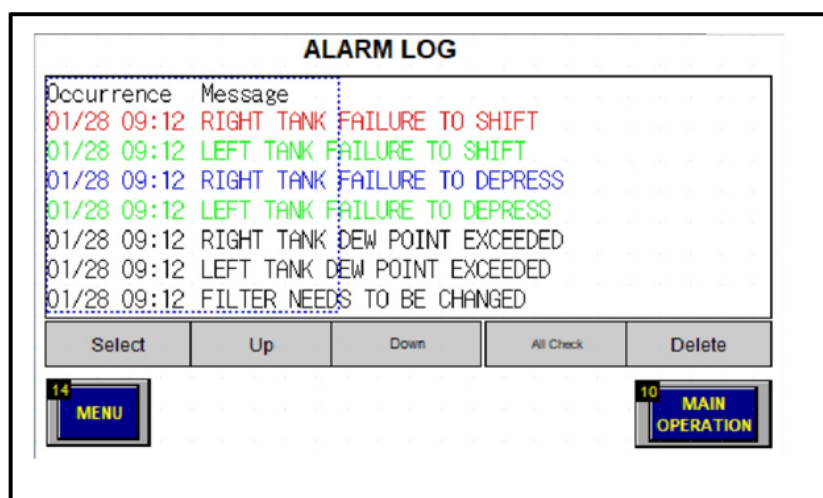


Figure 6-4.6b: Alarm Log Screen

- The Alarm Log screen will also appear any time an *Alarm* occurs or for a *Filter Change* warning. Once the active alarm or warning is acknowledged, the Main Operation button will take the controller back to the home screen. Alarms displayed will depend on the options that are purchased with the dryer.

6.4.7 Cycle Time Set

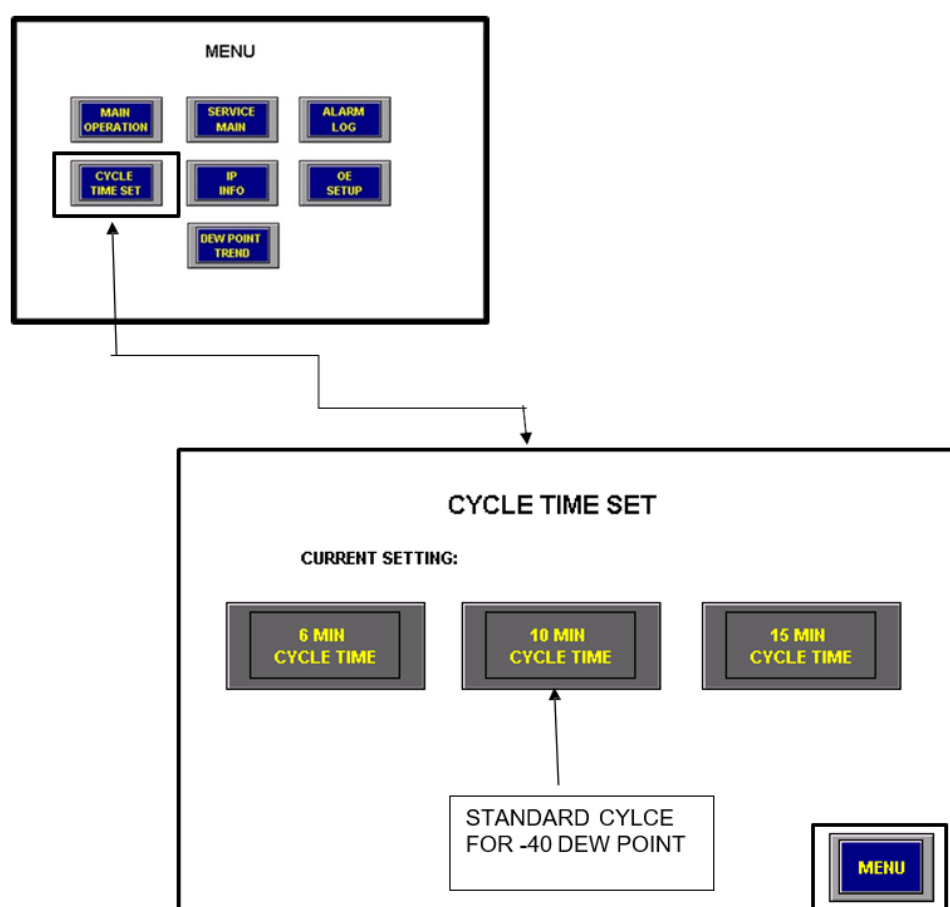


Figure 6-4.10: Cycle Time Set screen.

- Pressing the *Cycle Time Set* button will access a screen that allows the operator to select one of three NEMA time cycles. The standard cycle is a 10-minute cycle for a -40-dew point.

PLEASE NOTE: The cycle time should NEVER be changed without consulting the factory. The NEMA cycle will affect the dew point and must include other dryer operational settings.

- Pressing the Menu button will take the controller back to the Menu screen.

6.4.8 OE SETUP

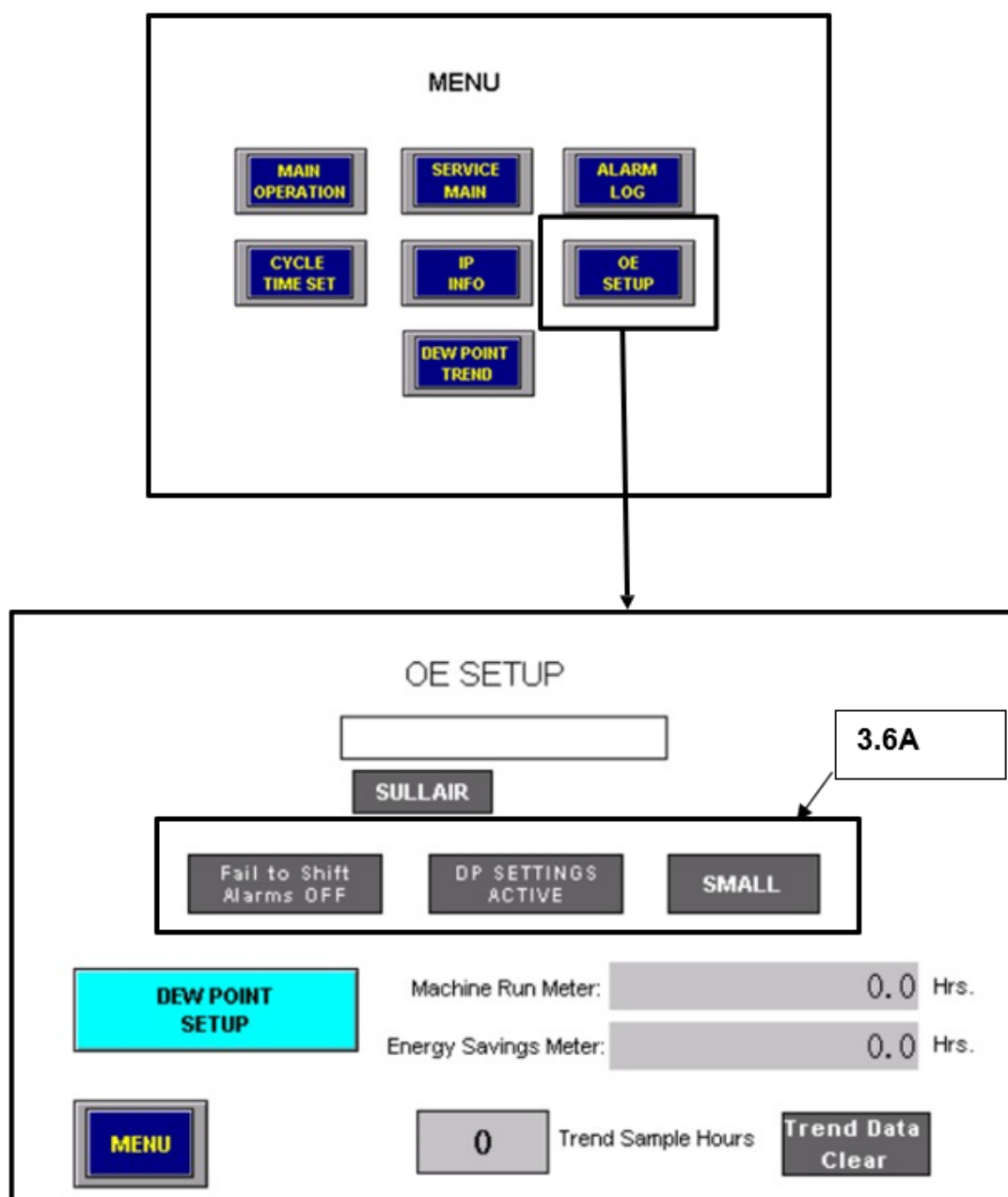


Figure 6-4.8: OE Setup Screen

- Pressing the *OE Setup* screen in the Menu screen will open the OE Setup screen. This screen gives access to turning purchased options on or off. The options include Fail to Shift, DP Setting Active and Small or Large dryer operation.
- Small Dryer Operation* is used on dryer models HDD-80 to HDD-1500 cfm. Setting this operation to Large is used for models HDD-2000 and larger. The Large setting allows for the operation of additional valving that is not present in the small operation.

6.4.9 Dew Point Setup

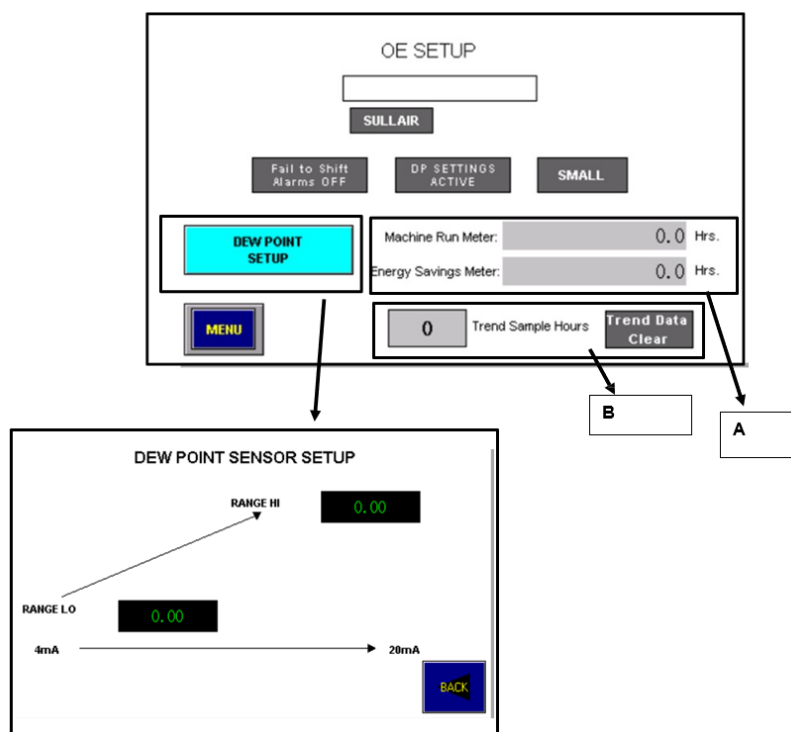


Figure 6-4.9a: Dew Point setup Screen-1

- The *Dew Point Sensor Setup* button takes the controller to the Dew Point Sensor Set up screen. Where the dew point sensor operating range is set. This is set at the factory and should not be changed.

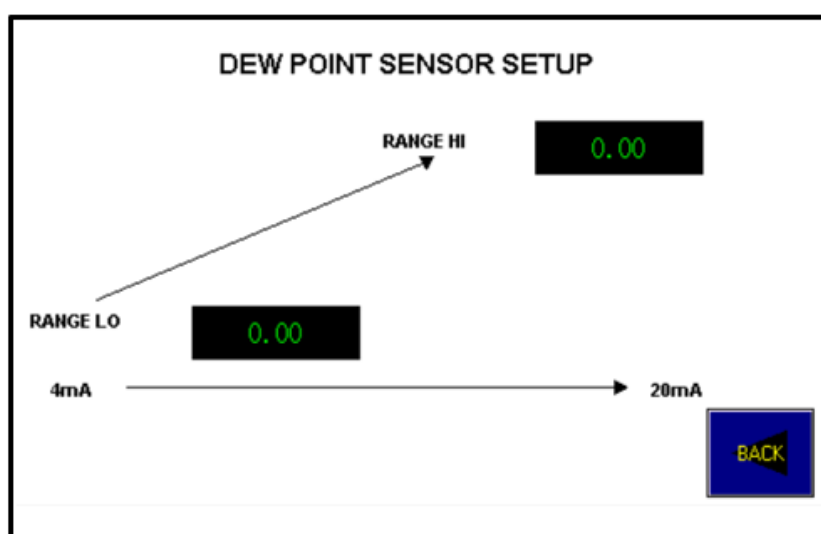


Figure 6-4.9b: Dew Point setup Screen-2

- Hour meter readings are displayed on the *OE Setup* screen. The Machine Run Meter is the same meter shown on the Service-Main Screen and it is the lifetime run hours meter. The Energy Savings Meter is a lifetime hour meter that the dryer is in energy savings mode. Neither of these hour meters can be reset in the field.
- Trend Sample Hours* is used to set how often the dew point trend graph takes a reading. This can be set from 1 hour up to 24 hours. The Trend Data Clear button clears the dew point trend graphs.

6.4.10 Dew Point Trend

- Pressing the Menu button will take the controller back to the Menu screen.
- Pressing the Dew Point Trend button on the Menu screen will take the controller to the dew point graphs. **Please Note:** If the dew point monitor option is not ordered this screen will have no function.

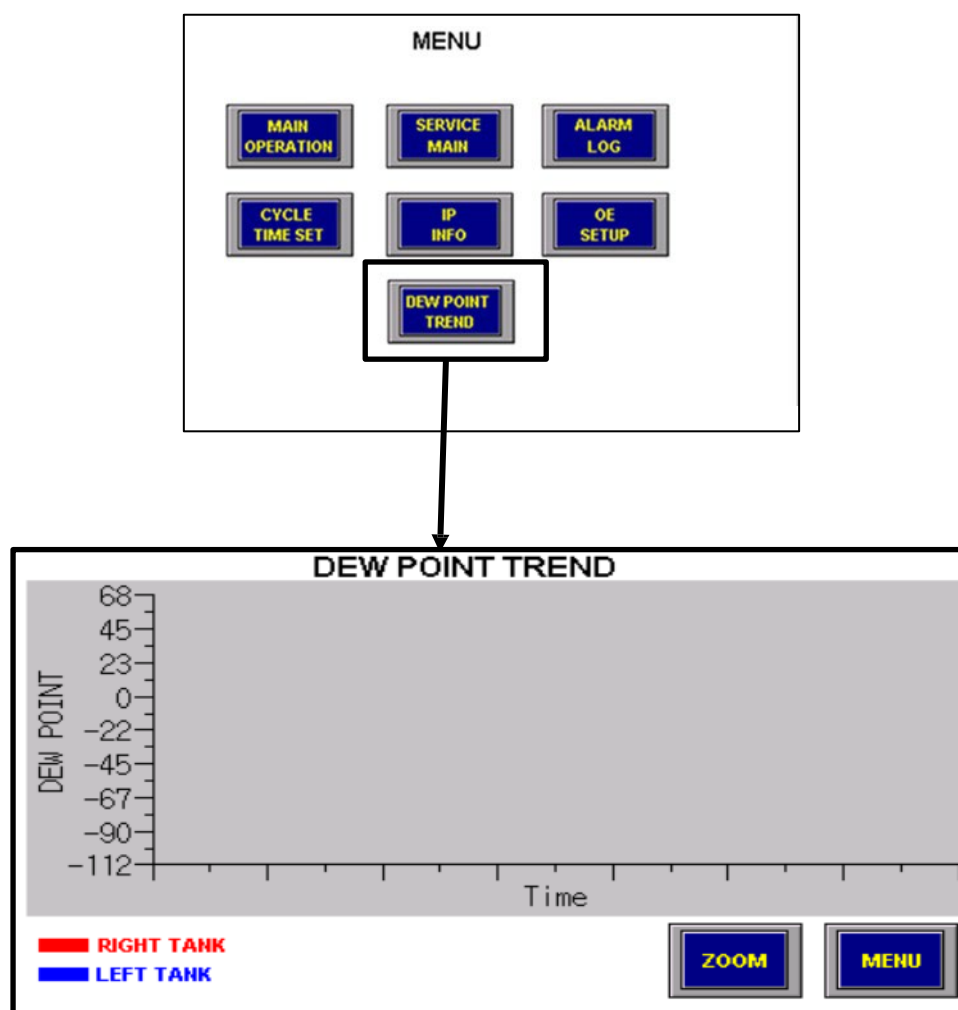


Figure 6-4.10a: Dew Point Trend Screen

- At the time of start-up, the graph will be empty. The factory setting in the *OE Setup* screen is set for 3 hours.
- The controller will take a dew point reading from the online tower after three hours of running time. Three hours later the controller will take a dew point reading from the other online tower. For example, the first dew point reading may be taken from either the left or right tower depending on which one is online drying. The second dew point reading will be taken from the other tower once it is in online drying mode. Once the graph has two or more readings the points will be connected by a line to create a trend graph.

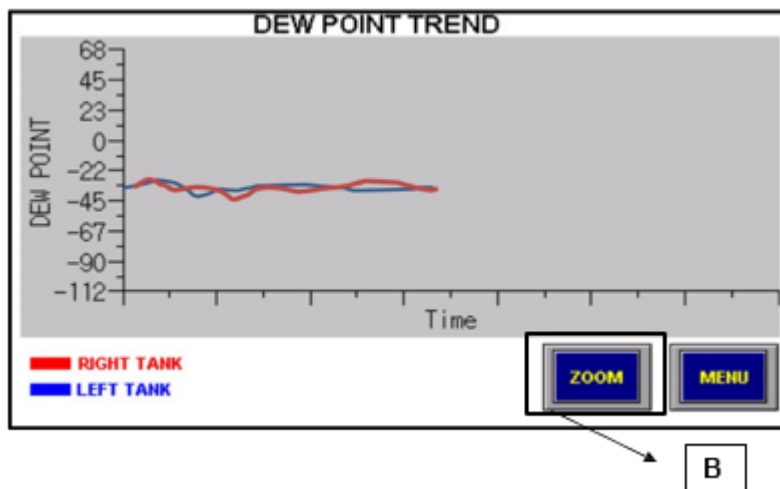


Figure 6-4.10b: Dew Point Trend Screen

- The red line will represent the right-side tower and the blue line will represent the left side tower. The Y-axis of the graph is scaled to the dew point probe's operating scale. The default scale will be (-112 to +68.) This scale is set at the factory in the Dew Point Sensor Setup screen and should not be changed. The graphing dew point sampling can be set from 1 hour up to 24 hours and can be cleared in the OE Setup screen.
- Pressing the Zoom button "B" will change the view of the graph by zooming in on the Y-axis scale to -30 through +30. The Zoom is a one step process, the Zoom Button will disappear, and a Back button will appear. Pressing the Back button will take the view back to the full scale

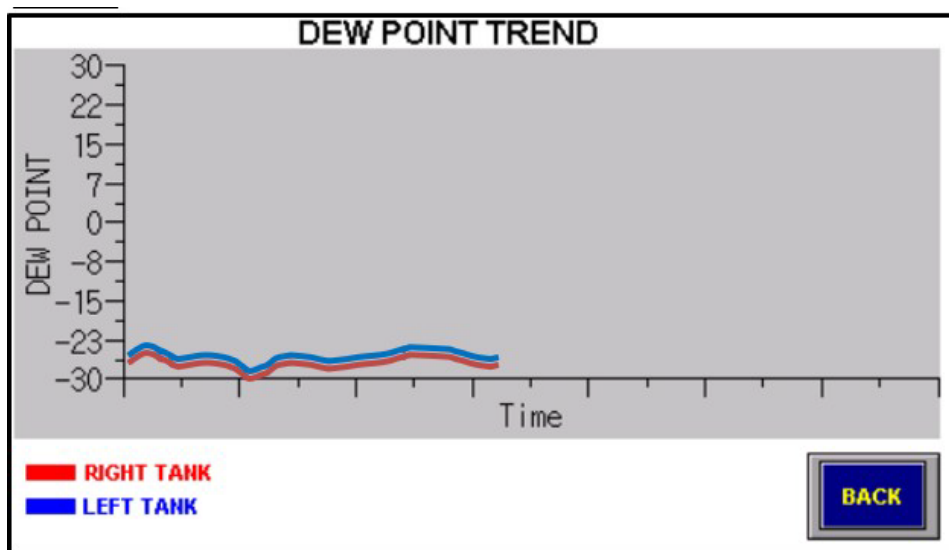


Figure 6-4.10c: Dew Point Trend Screen

6.4.11 IP INFO

- Pressing the “IP INFO” button “B” will bring up the IP “Information Screen”. This screen will display

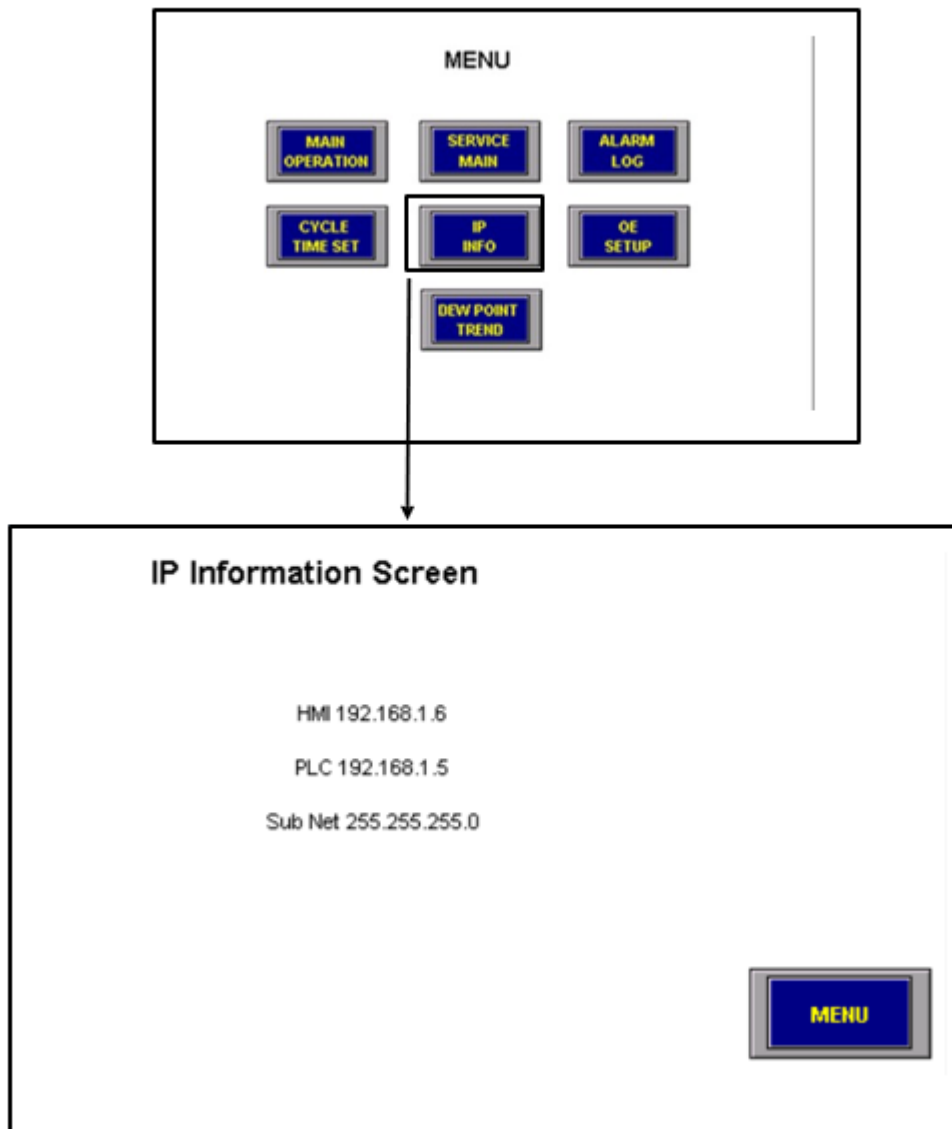


Figure 6-4.11: IP Info Screen

6.5 Dew Point Monitoring

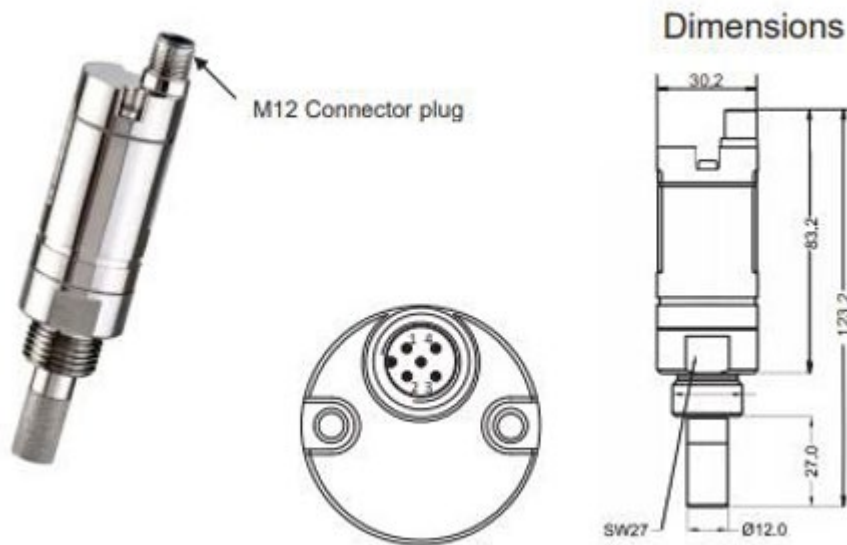
If a dew point monitor option is purchased a dew point demand mode can be activated. When activated and the dew point is below the low set point, the drying tower will stay on line until the dew point rises to the high set point. The regenerating tower will complete the regeneration cycle then be re-pressurized and stay in standby until the high set point is reached and the dryer switches towers. When the dew point is above the low set point the dryer will operate in a normal timed mode.

- The dew point sensor is intended for measuring the dew point or the pressure dew point in clean, dry and oil free gases and compressed air.
- The FAN -510 dew point sensor enables a reliable and long-term stable monitoring of the dew point in industrial application. With pressures dew point (dew point under pressure) up to 725 psig / 50 bar is measured directly.

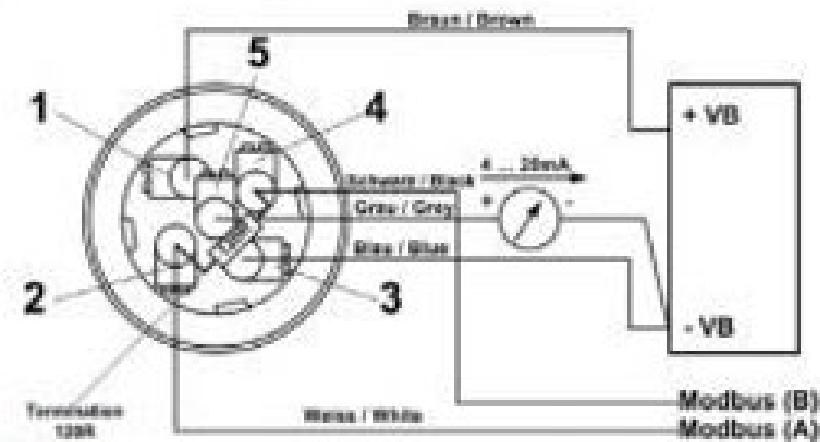
6.5.1 FAN-510 Technical Data

TECHNICAL DATA	
FAN-510	
Measuring range:	-112 to 68 °Ftd, -76...86 °Ftd, -4...122 °Ftd, or 0...100% RH
ACCURACY:	: ±1.8°F to 122...-4°Ftd ±3.6°F to -4...-58°Ftd ±5.4°F to -58...-112°Ftd
PRESSURE RANGE:	: -1...50 bar Special version up to 7251 psi
POWER SUPPLY:	24 VDC (10...36 VDC)
PROTECTION CLASS:	: IP 65 EMC
EMC:	In acc. with DIN EN 61326-1
OPERATING TEMP:	: -4...122 °F
CONNECTION	2 x M12, 5-pin for analog output, Modbus-RTU and alarm output, M-Bus (optional) Ethernet (PoE) (optional)
PC CONNECTION	Modbus-RTU interface (RS 485)
OUTPUTS (3 WIRE)	4...20 mA = -112 to 68 °Ftd 4...20 mA = -76...86 °Ftd 4...20 mA = -4...122 °Ftd
BURDEN FOR ANOLOG OUTPUT	< 500 Ω
ALARM RELAY:	NC, max. 60 VDC, 0.5 A
SCREW IN THREAD:	G 1/2"
DIMENSIONS HOUSING	3.01 x 3.35 x 2.95 inch (WxHxD)

6.6 Dew Point Diagram



		Pin 1	Pin 2	Pin 3	Pin 4	Pin 5
FAN-510	Connector Plug	(+VB)	RS485 A	(-VB)	RS485 B	(+1) Current output
	Connection Cable			..		
	0.554.0104 (5m)					
	0.554.0105 (10m)					



Section 7

Maintenance

7.1 With your dryer online

The following points must be verified at regular intervals.

- Daily, verify the prefilter automatic drain is functional.
- Once a week, verify the operating sequence at vessel change over.
- Weekly, check the dryer, pre-filter and after-filter for excessive pressure drop.

To load the new desiccant, the plug on the fill ports on the top head should be removed. Then install the amount and type of desiccant listed in *Section 3.3.1* in each vessel. Re-install the covers on the desiccant fill ports. Prior to placing the dryer in service all plugs and flanges that were removed should be leak tested. If any leaks occur they should be repaired and retested prior to placing the dryer in service. Desiccant change out

7.2 Monthly Inspections

- Verify the system is leak free.
- Verify the operation of all pressure gauges, and the dew point indicator.

7.3 Quarterly Inspections

- Repeat all monthly inspections.
- Check the pre-filter and after-filter elements for correct installation and excess dirt.
- Check for tightness of flange bolting.
- Verify purge exhaust mufflers are not plugged during regeneration. By assuring that there is no back pressure during the regeneration cycle.

7.4 Desiccant change out

Depending on the air quality and service conditions, the desiccant will last 4 to 5 years. Experience has shown that the period may be even longer.

To change the desiccant, ensure the system is out of service, locked out and de-pressurized. Remove the plug from the desiccant drain ports to allow the desiccant to fall from the vessel. At the end of this procedure re-install the plug.

7.5 Filter elements change out

The pre-filter and after-filter elements should be replaced when the following guidelines are exceeded.

- The differential pressure exceeds 5 psig/ .34 bar.
- The operating service exceeds 4,500 hours.
- A period of one year is exceeded.

Section 8

Troubleshooting

Symptom	Probable Cause	Remedy
High humidity alarm (with optional dew point monitor)	The regeneration of the desiccant beds is insufficient.	Reset the alarm with the "Alarm Reset" push button. Verify the heating and cooling operations by observing regenerations. Are the regeneration temperatures in accordance with those listed in <i>Section 3.7</i> ? Is the regeneration blower motor operational?
	The dewpoint probe service valves are closed.	Open the probe service valves.
Loss of power alarm	The control circuit fuse has blown.	Check the fuse and replace if necessary.
	The PLC has failed or is in an alarm condition.	Check the PLC to verify if any outputs are "on" or if the PLC alarm LED is on. Replace the PLC if necessary.
	The system incoming power has been lost.	Check the incoming power and restore the supply.
Blower overload alarm	The motor overload has operated.	Check the motor overload to see if it is defective. Check the operating conditions to see if the motor is operating overloaded as a result of a problem with the blower or motor bearing, etc.
Vessel #1 De-pressurization failure	The depressurization valve did not open.	Check the solenoid valves for correct operation. Check the valve actuator for correct operation.
	Vessel did not depressurize.	Check if the depressurization muffler is plugged.
	Vessel depressurized but alarm is on.	Check pressure switch for correct operation.
Vessel #2 De-pressurization failure	The depressurization valve did not open.	Check the solenoid valve for correct operation. Check the valve actuator for correct operation.
	Vessel did not depressurize.	Check if the depressurization muffle is plugged.
	Vessel depressurized but alarm is on.	Check pressure switch for correct operation.
Vessel #1 Re-pressurization failure	The re-pressurization valve did not open.	Check the air actuated ball valve for correct operation. Check the valve actuator for correct operation and check the pilot solenoid valve.
	Vessel re-pressurized but the alarm is on.	Check pressure switch PSH-1 for correct operation.

Symptom	Probable Cause	Remedy
Vessel #2 Re-pressurization	The re-pressurization valve did not open.	Check the pilot solenoid valve for correct operation. Check the valve actuator for correct operation.
	Vessel re-pressurized but the alarm is on.	Check pressure switch PSH-2 for correct operation.
Low operating pressure during regeneration	Compressor not running	Check compressor for operation
	System manual inlet isolation valve closed.	Check all manual valves upstream of the dryer and open as required.
Regeneration heater sheath over temperature failure	Defective or open circuit thermocouple.	Replace the thermocouple.
	Low or no regeneration blower flow.	Check the regeneration blower, motor, motor overloads and inlet filter. Replace as necessary.
	Defective temperature switch.	Replace the temperature switch.

Section 9

Spare Parts

HDD Spare Parts list		Generation	Unit Size (scfm)																								
Part Description	Part Number		80	100	125	150	200	250	300	400	500	600	800	1000	1250	1500	2000	2500	3000	3500	4000	4500	5000				
Control Line Air Filter Element (NFX-45-F)	0392-0045-566-0		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
Control Line Air Filter Element (NFA-45-F)	0391-0045-0																										
Control Line Air Filter Element (NFX-130-F)	0392-0130-590-1																										
Inlet Air Filter Element (NFX-0130-H)	0392-0130-590-1		1	1	1																						
Inlet Air Filter Element (NFX-0240-H)	0392-0240-591-1					1	1																				
Inlet Air Filter Element (NFX-0350-H)	0392-0350-592-1								1	1																	
Inlet Air Filter Element (NFX-0475-H)	0392-0475-593-1											1															
Inlet Air Filter Element (NFX-0700-H)	0392-0700-594-1													1	1												
Inlet Air Filter Element (NFX-1350-H)	0392-1350-597-1															1	1	1									
Inlet Air Filter Element (NFX-1600-H)	0392-1600-196-1																	1									
Inlet Air Filter Element (NFG-2500-H)	0390-2500-103-1																			1	1						
Inlet Air Filter Element (NFG-3800-H)	0390-3800-104-1																					1	1				
Inlet Air Filter Element (NFG-5000-H)	0390-5000-105-1																							1	1	1	
Outlet Air Filter Element (NFX-0130-FR)	0392-0130-579-2		1	1	1																						
Outlet Air Filter Element (NFX-0240-FR)	0392-0240-580-2					1	1																				
Outlet Air Filter Element (NFX-0350-FR)	0392-0350-581-2									1	1																
Outlet Air Filter Element (NFX-0475-FR)	0392-0475-582-2												1														
Outlet Air Filter Element (NFX-0700-FR)	0392-0700-583-2														1	1											
Outlet Air Filter Element (NFX-1350-FR)	0392-1350-585-2																1	1	1								
Outlet Air Filter Element (NFX-1600-FR)	0392-1600-194-2																		1								
Outlet Air Filter Element (NFG-2500-FR)	0390-2500-975-2																			1	1						
Outlet Air Filter Element (NFG-3800-FR)	0390-3800-976-2																					1	1				
Outlet Air Filter Element (NFG-5000-FR)	0390-5000-977-2																							1	1	1	
3/16" Activated Alumina Desiccant in lbs	Source Locally		92	115	145	175	230	290	350	430	575	750	920	1150	1450	1725	2300	2875	3450	4025	4600	5175	5750				
Inlet Timer Drain valve	N-TD-10		1	1	1	2	1	1	1	1	1	1	1	1	1	1	1										
Inlet Timer Drain valve	N-TD-20																	1	1	1	1	1	1	1			
Dryer Controller (115V) NHDC-2100	92259226-539	2011+																									
Dryer Controller (115V) NHDC-2200	92259226-540	2011-2022	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
Dryer Controller (220/230V) NHDC-2200	92259226-541	2011-2022	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
Dryer Controller (115V) NHDC-2300-TS	9000-8613	2021+	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
Dryer Controller (220/230V) NHDC-2300-TS	9000-8614	2021+	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
Tank Pressure Gauge	N-PSB25-200		2	2	2	2	2	2	2	2	2																
Tank Pressure Gauge	92250267-127													2	2	2	2	2	2	2	2	2	2	2			
Pressure Relief Valve (1/4")	N-MCSP25-200		2	2																							
Pressure Relief Valve (1/2")	N-MCSF50-200			2	2	3	2	2	2																		
Pressure Relief Valve (3/4")	N-MCSB75-200											2	2														
Pressure Relief Valve (1")	N-MCSW10-200													2	2	2											
Pressure Relief valve (1-1/4")	N-MCSW12-150															2	2	4	4								
Pressure Relief Valve (1-1/2")	92250204-566																										
Pressure Relief Valve (2")	N-19MHH-150																					2	2				
Pressure Relief Valve (2-1/2") BRASS NC	9000-8635																							2	2	2	
Purge Exhaust Valves (1/2") BRASS NC	N-8290B002	2011-2018	2																								
Purge Exhaust Valves (3/4") BRASS NC	N-8290B005	2011-2018		2	2	2																					

HDD Spare Parts list		Unit Size (scfm)																							
Part Description	Part Number		80	100	125	150	200	250	300	400	500	600	800	1000	1250	1500	2000	2500	3000	3500	4000	4500	5000		
Purge Exhaust Valves (1") BRASS NC	N-8290B010	2011-2018					2	2	2																
Purge Exhaust Valves (1.5") BRASS NC	N-8290A020	2011-2018								2	2	2													
Purge Exhaust Valves (2") BRASS NC	N-8290A025	2011-2018											2	2	2	2	4	4	4	4	4	4	4		
Purge Exhaust Valves (1/2") STAINLESS NC	9000-8624	2019+	2																						
Purge Exhaust Valves (3/4") STAINLESS NC	9000-8625	2019+		2	2	2																			
Purge Exhaust Valves (1") STAINLESS NC	9000-8626	2019+					2	2	2																
Purge Exhaust Valves (1.5") STAINLESS NC	9000-8627	2019+								2	2	2													
Purge Exhaust Valves (2") STAINLESS NC	9000-8628	2019+											2	2	2	2	4	4	4	4	4	4	4		
Purge Exhaust Mufflers (1/2")	92250220-837		2																						
Purge Exhaust Mufflers (3/4")	92250220-839			2	2	2																			
Purge Exhaust Mufflers (1")	92250220-840						2	2	2																
Purge Exhaust Mufflers (1-1/2")	92250220-841									2	2	2													
Purge Exhaust Mufflers (2")	92250220-842												2	2	2	2	4	4	4	4	4	4	4		
Air Inlet Valve (3/4")	N-8290B027	2011-2018	2																						
Air Inlet Valve (1")	N-8290B028	2011-2018		2	2	2	2	2	2																
Air Inlet Valve (1-1/2")	N-8290B032	2011-2018								2	2	2													
Air Inlet Valve (2")	N-8290B035	2011-2018																							
Air Inlet Valve "B" (3") NO	92250234-482												2	2	2	2									
Valve Actuator Double Acting "B" (3")	92250234-481												2	2	2	2									
Air Inlet valve "B" (4")	9000-8617																2	2							
Valve Actuator Double Acting "B" (4")	92250234-481																2	2							
Air Inlet valve "B" (6")	9000-8618																		2	2	2	2	2		
Valve Actuator Double Acting "B" (6")	9000-8619																		2	2	2	2	2		
Air Inlet Valve (1/2") STAINLESS NO	9000-8629	2019+	2																						
Air Inlet Valve (3/4") STAINLESS NO	9000-8630	2019+																							
Air Inlet Valve (1") STAINLESS NO	9000-8631	2019+		2	2	2	2	2	2																
Air Inlet Valve (1-1/2") STAINLESS NO	9000-8632	2019+								2	2	2													
Air Inlet Valve (2") STAINLESS NO	9000-8633	2019+											2	2	2	2									
Air Inlet Valve" D" (3") NO	N-DVA-3FO												2	2	2	2									
Valve Actuator Double Acting "D" (3") DA	N-DVA-3DA												2	2	2	2									
Air Inlet valve "D" (4") NO	N-DVA-4FO																2	2							
Valve Actuator Double Acting "D" (4") DA	N-DVA-4FO																2	2							
Air Inlet valve "D" (6") NO	N-DVA-6NO																		2	2	2	2	2		
Valve Actuator Double Acting "D" (6") DA	N-DVA-6DA																		2	2	2	2	2		
Outlet Check Valve (3/4")	N-UPC205-4		2																						
Outlet Check Valve (1")	N-UPC205-6			2	2	2	2																		
Outlet Check Valve (1-1/2")	N-UPC205-8							2	2																
Outlet Check Valve (2")	N-UPC205-9									2	2	2													
Outlet Check Valve (3")	9000-8621												2	2	2	2									
Outlet Check Valve (4")	9000-8622																2	2	2						
Outlet Check Valve (6")	9000-8623																			2	2	2	2		
Inlet Solenoid Valve	N-SC8551A018MS-120VAC		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Gauge Pressure Snubber	N-PS-25		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
Strainer 1"	92250210-914		4	4	4	4	4																		
Strainer 1-1/2"	92250210-915							4	4																
Strainer 2"	92250210-916									4	4	4													
Strainer 3"	92250210-917												4	4	4	4									
Strainer 4"	92250210-918																4	4							
Strainer 6"	92250210-919																		4	4	4	4	4		
Purge Adjustment Valve 3/8"	92259222-096		1	1	1	1	1																		
Purge Adjustment Valve 1/2"	92250209-360							1	1																
Purge Adjustment Valve 3/4"	92259222-097									1	1	1													
Purge Adjustment Valve 1"	N-NV1												1	1	1	1	2	2	2	2	2	2	2		
Controller Fuse 2 amp	92250222-098		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		

HDD Spare Parts list		Unit Size (scfm)																								
Part Description	Part Number		80	100	125	150	200	250	300	400	500	600	800	1000	1250	1500	2000	2500	3000	3500	4000	4500	5000			
Power Cord (115VAC)	92250217-327		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
DHL Controller Mem Mod	N-ZEN-ME01	2011-2022	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Shuttle Valve 1/8"	N-SCS-668-06		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Solenoid Valve 24VAC 4WAY, 2POS	92250205-132		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Solenoid Valve 120 VAC 4WAY, 2POS	N-SC8551A018MS-120VAC		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Solenoid Valve 230/220 VAC 4WAY,2 POS	92250218-124		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Solenoid Valve 3WAY 1/8" 240VAC	92250206-822		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Solenoid Valve 3WAY 1/8" 24VAC	92250208-063		2	2	2	2	2	2	2	2	2	2														
Solenoid Valve 3WAY 1/8" 120VAC	92250206-311		2	2	2	2	2	2	2	2	2	2														
Solenoid Valve 1/4" (230-220vac)	92250208-646												2	2	2	2	4	4	4	4	4	4	4			
Solenoid Valve 1/4" (120VAC)	N-SC8320G184-120VAC												2	2	2	2	4	4	4	4	4	4	4			
Sample Cell 1/4" NPT	92250216-259		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Red LED 120V NHDC-2200 Controller	92250215-636	2011-2022	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Green LED 120V NHDC-2200 Controller	92250215-637	2011-2022	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			
Yellow LED 120V NHDC-2200 Controller	92250215-638	2011-2022	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			
Dew Point Sensor (FAN-510)	9000-8650	Option	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Dew Point Sample Cell	9000-8637	Option	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Dew Point Sensor (FAN-500)	9000-8648	Option																								
On/Off Switch	N-HW1S-2TF10		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
HMI Color Display Touchscreen NHDC-2300	9000-8638	2021+	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Controler, Logic 24VDC NHDC-2300	9000-8642	2021+	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Analog Module NHDC-2300	9000-8639	2021+	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Power Supply NHDC-2300	9000-8644	2021+	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
PLC to HMI Cable NHDC-2300	9000-8640	2021+	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			

Section 10

Safety Data Sheet

10.1 Activated Alumina

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1. Substance/preparation and company identification

Company
BASF Catalysts LLC
100 Campus Drive
Florham Park, NJ 07932

24 Hour Emergency Response Information
CHEMTREC: 1-800-424-9300
BASF HOTLINE: 1-800-832-HELP

2. Composition/information on ingredients

<u>CAS Number</u>	<u>Content (W/W)</u>	<u>Chemical name</u>
1333-84-2	>= 94.0 - <= 100.0 %	Aluminum oxide (Al ₂ O ₃), hydrate

3. Hazard identification

Emergency overview

CAUTION: MAY CAUSE EYE, SKIN AND RESPIRATORY TRACT IRRITATION.
MAY CAUSE DIFFICULTY BREATHING.
PROLONGED OR REPEATED CONTACT MAY RESULT IN DERMATITIS.
Contact with the eyes or skin may cause mechanical irritation.
Contains material which may indicate/cause the possibility of sensory and pulmonary irritation.
Avoid contact with the skin, eyes and clothing.
Avoid inhalation of dusts.
Use with local exhaust ventilation.
Wear a NIOSH-certified (or equivalent) particulate respirator.
Wear safety glasses with side-shields.
Wear chemical resistant protective gloves.
Wear protective clothing.
Eye wash fountains and safety showers must be easily accessible.

Potential health effects

Primary routes of exposure

Routes of entry for solids and liquids include eye and skin contact, ingestion and inhalation. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquified gases.

4. First-aid measures

If inhaled:

Keep patient calm, remove to fresh air. If necessary, give oxygen. If not breathing, give artificial respiration. Seek medical attention if necessary.

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If on skin:

After contact with skin, wash immediately with plenty of water and soap. Consult a doctor if skin irritation persists.

If in eyes:

In case of contact with the eyes, rinse immediately for at least 15 minutes with plenty of water. Immediate medical attention required.

If swallowed:

No hazards anticipated. If large quantities are ingested, seek medical advice.

5. Fire-fighting measures

Flash point:

Non-flammable.

Additional information:

Use extinguishing measures to suit surroundings.

Hazards during fire-fighting:

No particular hazards known.

Protective equipment for fire-fighting:

Wear self-contained breathing apparatus and chemical-protective clothing.

NFPA Hazard codes:

Health : 0

Fire: 0

Reactivity: 1

Special:

6. Accidental release measures

Cleanup:

Vacuum up spilled product. Place into suitable container for disposal.

7. Handling and storage

Handling**General advice:**

Avoid dust formation in confined areas. Avoid contact with the skin, eyes and clothing. Ensure adequate ventilation.

Storage**General advice:**

Keep container tightly closed in a cool, well-ventilated place.

Storage stability:

Keep container dry.

8. Exposure controls and personal protection

Components with workplace control parameters

Aluminum oxide (Al ₂ O ₃), hydrate	OSHA	PEL 5 mg/m ³ Respirable fraction ; PEL 15 mg/m ³ Total dust ;
	ACGIH	TWA value 10 mg/m ³ ;

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Advice on system design:

Provide local exhaust ventilation to control dust.

Personal protective equipment**Respiratory protection:**

Wear a NIOSH-certified (or equivalent) particulate respirator. Observe OSHA regulations for respirator use (29 CFR 1910.134).

Hand protection:

Wear chemical resistant protective gloves., Consult with glove manufacturer for testing data.

Eye protection:

Safety glasses with side-shields.

Body protection:

Body protection must be chosen based on level of activity and exposure.

9. Physical and chemical properties

Form:	powder, granules, pellets, balls
Odour:	odourless
Colour:	off white
pH value:	9.4 - 10.1
Melting point:	2,050 °C
Solubility in water:	insoluble

10. Stability and reactivity

Substances to avoid:

water

Hazardous reactions:

The product is chemically stable.

Addition of water leads to increase in temperature.

11. Toxicological information

Chronic toxicity**Other information:**

No data available.

12. Ecological information

Environmental toxicity**Other ecotoxicological advice:**

No data available.

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13. Disposal considerations

Waste disposal of substance:

Dispose of in accordance with local authority regulations.
Check for possible recycling.
Disposal requirements are dependent on the hazard classification and will vary by location and the type of disposal selected.
All waste materials should be reviewed to determine the applicable hazards (testing may be necessary).

14. Transport information

Land transport USDOT

Not classified as a dangerous good under transport regulations

Sea transport IMDG

Not classified as a dangerous good under transport regulations

Air transport IATA/CAO

Not classified as a dangerous good under transport regulations

15. Regulatory information

Federal Regulations

Registration status:
TSCA, US released / listed

OSHA hazard category: ACGIH TLV established

SARA hazard categories (EPCRA 311/312): Acute

SARA 313:

<u>CAS Number</u>	<u>Chemical name</u>
1333-84-2	Aluminum oxide (Al ₂ O ₃), hydrate

16. Other information

HMIS III rating

Health: 1 Flammability: 0 Physical hazard: 1

HMIS uses a numbering scale ranging from 0 to 4 to indicate the degree of hazard. A value of zero means that the substance possesses essentially no hazard; a rating of four indicates high hazard.

Local contact information

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prod_reg@basf.com

END OF DATA SHEET

10.2 Molecular Sieve

MATERIAL SAFETY DATA SHEET

MOLECULAR SIEVE 4A

Emergency Telephone Number: 800-424-9300

The following information is based upon our current knowledge and experience of our product and is not exhaustive. It applies to the product as defined by the specifications. In case of combinations or mixtures, one must confirm the no new hazards are likely to exist. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene, and integrity of the work environment. (Unless noted to the contrary, the technical information applies only to pure products.)

1. IDENTIFICATION

1.1 Product Name:	Molecular Sieve 4A
1.2 Chemical Name:	Molecular Sieve
1.3 Synonyms:	Aluminosilicate 4 A, Zeolite 4A
1.4 Trade Names:	None
1.5 Formula:	$\text{Na}_2\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2 \cdot \text{XH}_2\text{O}$
1.6 Molecular Weight	285
1.7 CAS Number	1344-00-9
1.8 EINECS Number	

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name:	Sodium aluminum silicate
Percent	100%
CAS Number:	1344-00-9
ACGIH TLV (1992-1993):	Not established
OSHA Pel:	Not established
Niosh (RTECS) Number:	1000369SS

3. HAZARD IDENTIFICATION

4. FIRST AID MEASURES

4.1 Routes of Exposure:	Inhalation? Skin? Ingestion?
4.2 Effects:	May cause irritation or caustic burns on skin in presence of moisture.
4.2.1 Inhalation:	Yes
4.2.2 Eyes:	Yes
4.2.3 Skin:	No
4.2.4 Ingestion:	No

4.3 Regulatory/Carcinogenicity	
NTP?:	No
IARC?:	No
OSHA?:	No

4.4 Medical Conditions Aggravated by Exposure:	Breathing of dust may aggravate asthma
--	--

4.5 First Aid:

4.5.1 Inhalation: Remove to fresh air. Consult a physician.

4.5.2 Eye Contact: Flush with plenty of water for at least 15 minutes. Consult a physician.

4.5.3 Skin Contact: Flush with plenty of water for at least 15 minutes. Consult a physician.

4.5.4 Ingestion: If swallowed, drink two glasses of water. Induce vomiting. Consult a physician. Never give anything by mouth to an unconscious person.

4.6 General Recommendation: Avoid breathing dust or contact with skin. Avoid material contact with water.

4.7 Medical Appendix: In case of skin burns use procedure for caustic burns.

5. FIREFIGHTING MEASURES

5.1 Common Extinguishing Methods: Use media appropriate for surrounding fire.

5.2 Inappropriate Extinguishing Methods: Unknown.

5.3 Specific Hazards: Used product may contain products of a hazardous nature. Inform fire fighters of hazards of retained chemicals.

5.4 Protective Measures in Case of Intervention: When exposed to water, product will get hot. Flood with water to reduce to safe temperature.

5.5 Other Precautions: None

6. ACCIDENTAL RELEASE MEASURES

6.1 Individual and Collective Precautions: Wear suitable personal protective equipment.

6.2 Cleaning Methods: Sweep up, minimizing dusting and place in appropriate container. Dispose in accordance with all local, state and federal regulations.

6.3 Precautions for Protecting the Environment: Solid waste disposal.

7. HANDLING AND STORAGE

7.1 Handling: Wear suitable personal protective equipment. Avoid dusting.

7.2 Storage: Store in cool, dry, well-ventilated location.

7.3 Packaging: Keep container closed.

7.4 Other Precautions: Use good work hygiene practices. Wash thoroughly after use and before eating, drinking or smoking. Vacuum up any dust. Launder clothing before reuse.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Engineering Controls:

8.2 Respiratory Protection: Niosh approved dust mask

8.3 Hand Protection: Rubber/Plastic gloves

8.4 Eye Protection: Safety glasses/goggles

8.5 Skin Protection: Wear adequate protective equipment to prevent skin contact.

9. PHYSICAL AND CHEMICAL PROPERTIES	
9.1 Appearance: Light tan spherical beads.	9.2 Odor: No odor
9.3 PH: N/A	9.4 Boiling Point/Range: N/A
9.5 Melting Point/Range: N/A	9.6 Flash Point: N/A
9.7 Flammability: N/A	9.8 Autoignition Temperature: None
9.9 Danger of Explosion: None	9.10 Combustible Characteristics: N/A
9.11 Vapor Pressure: N/A	9.12 Vapor Density (Air=1): N/A
9.13 Specific Gravity (H ₂ O=1): Varies	9.14 Solubility: Water: Insoluble Other Solvents: N/A Lipid Solubility: N/A
9.15 Viscosity: N/A	9.16 Decomposition Temperature: N/A
9.17 Partition Coefficient p (n-octanol/water):	9.18 Other Data:

10. STABILITY AND REACTIVITY
10.1 Stability: Yes
10.2 Conditions to Avoid: Addition of water without flooding will generate heat and can cause skin burn.
10.3 Materials to Avoid: No information available.
10.4 Hazardous Decomposition Products: none
10.5 Other Information:

11. TOXICOLOGICAL INFORMATION	
11.1 Acute Toxicity:	
11.1.1 LD50-oral	No Information Available
11.1.2 LD50-skin	No Information Available
11.1.3 LD50-inhalation	No Information Available
11.1.4 Irritation (skin, eyes):	No Information Available

11.1.5 Sensitization:	N/A
11.2 Chronic Toxicity: Acute: Eye, Skin and respiratory tract irritation.	
Inhalation: Chronic: The drying action of this product can cause irritation of the mucous membranes of the nose and throat and irritation of the skin. Avoid prolonged breathing of dust.	

12. EXOTOXICOLOGICAL INFORMATION	
12.1 Acute Toxicity:	
12.1.1 LC50 - fish:	No Information Available
12.1.2 LC50- daphnia:	No Information Available
12.2 Environmental Behavior:	
12.2.1 Mobility:	N/A
12.2.2 Persistence	N/A
12.2.3 Degradation:	
Abiotic:	N/A
Biotic:	N/A
12.2.4 Potential for Bioaccumulation	
	N/A

13. DISPOSAL CONSIDERATIONS	
13.1 Waste Treatment: Dispose in accordance with all local, state, and federal regulations.	
13.2 Packaging Treatment:	
14. TRANSPORT	
14.1 UN Number: None	
14.2 Classification	
Label Required: None	
Not regulated for the following mode of transportation: DOT, IMO, IATA	
Emergency response number: 24-Hour contact Chemtree 800-424-9300	
15. REGULATORY INFORMATION	
15.1 EEC Labeling:	
15.2 NFPA/HMIS Labeling:	
15.2.1 NFPA:	
Fire:	0
Health:	1
Reactivity:	1
15.2.2 HMIS	
Health:	1
Flammability:	0
Reactivity:	0
Personal Protection:	
15.3 Authorized Limit Value:	
15.3.1 TLV (ACGIH) - TWA:	NOT ESTABLISHED
15.3.2 PEL (OSHA)-PEL:	NOT ESTABLISHED
15.3.3 Other:	
15.4 Other Regulations:	
16. OTHER INFORMATION	
16.1 Edition Date: June 1995	
16.2 Revision Number: 2	
16.3 Updated: May 2005	



NEXT Air & Gas

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