

Operating Manual
Heatless Regenerated Dryer

DRYPOINT[®] ACF 80 – 5100

&

DRYPOINT[®] ACF 80 – 5100 (PLUS)

Table of Contents

1.	<i>SAFETY RULES</i>	
1.1	Definition of the Safety Symbols Used	3
1.2	Warnings	3
1.3	Proper Use of the Dryer	3
1.4	Transport	3
2.	<i>Technical Specifications</i>	
2.1	Technical Specifications of the ACF80-440	4
2.2	Technical Specifications of the ACF580-5100	5
3.	<i>START UP</i>	
3.1	Installation Site	6
3.2	Installation Layout	6
3.3	Correction Factors	7
3.4	Connection to the Compressed Air System	7
3.5	Main Power Connection	8
3.6	Inlet Filter Condensate Drain	8
4.	<i>TECHNICAL SPECIFICATIONS</i>	
4.1	Preliminary Operation	8
4.2	Purge Adjustment	9
4.3	First Start-Up	10
4.4	Operation and Switching OFF	10
5.	<i>TECHNICAL DESCRIPTION</i>	
5.1	Control Panel	11
5.2	Heatless Dryer Description	11
5.3	Flow Diagram	11
5.4	Operation	12
5.5	Electronic Controller	13
5.5.1	Display Panel	13
5.5.2	Programming (Set Up) Load %	17
5.5.3	Operation Configuration	18
5.5.4	Operating Cycles	20
5.5.5	Maintenance	23
5.6	DewPoint Meter (Optional)	25
5.7	Pressure Switches of "Fail to Switch Alarm" (Optional)	26
6.	<i>MAINTENANCE, TROUBLESHOOTING, SPARE PARTS</i>	
6.1	Controls and Maintenance	27
6.2	Troubleshooting	28
6.3	Suggested Spare Parts	30
6.4	Dismantling of the Dryer	32
7.	<i>ATTACHMENTS</i>	
7.1	Dryer Dimensional Drawings	
	ACF 80 - 5100	33 - 44
7.2	Electric Diagram	45

1.1 DEFINITION OF THE SAFETY SYMBOLS



Before attempting any service on the dryer, read through the Instruction, Operation and Maintenance Manual.



General Warning Sign: Risk of danger and/or possibility of damage to the machine. Carefully read the text next to this symbol.



Electrical Hazard: The Electrical Symbol indicates the possibility of electrocution. Carefully read the text next to this symbol.



Danger Hazard: Under Pressure. Carefully read the text next to this symbol.



Danger Hazard: Component or system which during the operation can reach high temperature. Carefully read the text next to this symbol.



Danger Hazard: Non-Breathable Air. Carefully read the text next to this symbol.



Danger Hazard: Do not use water to extinguish fire on/or about the dryer. Carefully read the text next to this symbol.



Danger Hazard: Do not operate the dryer when parts (under pressure or electric panels) are not in place or have been tampered with and changed. Carefully read the text next to this symbol.



Danger Hazard: Machine level noise could be higher than 85 dBA. Install the machine in a dedicated area where people are not normally present. The installer and/or end user is responsible for correct installation of the dryer, in order to prevent excessive noise exposure to the work environment. The installer and/or the end user is also responsible to install proper safety signs at the installation site. Carefully read the text next to this symbol.



Danger Hazard: The technician that services the machine must wear hearing protection while servicing the dryer. Each employee must select proper PPD (Personal Protection Device) hearing protector (earmuffs, ear canal caps and earplugs) in order to prevent permanent hearing loss. Carefully read the text next to this symbol.



Maintenance Symbol: Installation, commissioning and/or servicing must be performed by a qualified person ¹.



Compressed air inlet connection point.



Compressed air outlet connection point.



Condensate drain connection point.



Service and operations which can be performed by the operator of the machine, if qualified ¹.



Environmental Symbol:

- Dryer and relevant packaging composed of recyclable materials.
- Energy saving design.

Please honor our commitment; the end user should follow ecological suggestions marked with this sign.

¹ Experienced and trained personnel acquainted with the relevant rules and laws, capable to perform the needed activities and to identify and avoid possible dangerous situations while handling, installing, using and servicing the machine.

1.2 WARNINGS



Compressed Air Warning: Compressed Air is a highly hazardous energy source. Never work on the dryer with parts under pressure. Never point the compressed air or the condensate drain jet towards anybody. The end user is responsible for the installation of the dryer, which has been laid out in the “Installation” chapter. If Commissioning steps are not followed, the warranty will be voided and dangerous situations for the personnel and/or damages to the machine could occur.



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

- Ensure that no part of the machine is powered and is locked out of the mains (following local Lock-out Tag-out Requirements).
- Ensure that no part of the dryer is under pressure by isolating the dryer from the compressed air system.



Any change to the machine or to the relevant operating parameters, if not previously verified and authorised by the Manufacturer, in addition to create the possibility of dangerous conditions will void the warranty.



Don't use water to extinguish fire on the dryer or in the surrounding area.

1.3 PROPER 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 has to be considered improper. The Manufacturer will not be responsible for any problem arising from improper use; the user will be in any/all cases responsible for any resulting damage.

Moreover, the correct use requires the compliance with the installation conditions, in particular:

- Voltage and frequency of the Power Supply
- Pressure, temperature and flow-rate of the incoming air
- Ambient temperature

This dryer is supplied, tested and fully assembled. The only operation left to the user is the connection to the plant in compliance with the instructions given in the following chapters.



The purpose of the machine is the separation of water and eventual oil particles present in compressed air. The dried compressed air cannot be used for respiration purposes.

1.4 TRANSPORT

Verify the integrity of the packaging, place the unit near to the installation point and unpack the contents.

- To move the packaged unit, we suggest the use of a suitable crane or forklift. We do not recommend moving by hand.
- Handle with care. Heavy blows could cause irreparable damage.
- Even when packaged, keep the machine protected from severe weather.



The packaging materials are recyclable. Each single material must be properly disposed in a manner complying with the rules and regulations of the local municipality government.

MODEL		ACF					
		80	120	160	220	320	440
Air flow ¹	[scfm]	80	120	160	220	320	440
DewPoint under pressure	[°F]	-4, -40, -100					
Minimum ambient temperature	[°F]	32-0					
Standard inlet air temperature	[°F]	100°F (38°C)					
Max inlet air temperature	[°F]	130°F (55°C)					
Standard inlet air pressure	[psig]	100 psig (7 barg)					
Max inlet air pressure	[psig]	150 psig (10 barg)					
Inlet – outlet connections	[NPT-F]	3/4"	1"	1"	1½"	1½"	1½"
Adsorbent material -Type		Activated Alumina					
- Quantity	Lbs (kg)	100 (45.5)	140 (63.6)	180 (81.8)	250 (113.6)	360 (163.6)	490 (222.7)
Standard electrical supply	V/Ph/Htz	100-120V / 1 ph / 50-60Hz or 220-240 / 1 ph / 50-60Hz					
Electric nominal power	[W]	50					
Level noise at 1 m	[dbA]	> 85					
Weight	[Lbs]	475	490	560	650	780	950

¹ The nominal conditions refer to an inlet air pressure of 100 psig and a temperature of +100 °F.

MODEL	ACF								
	580	740	900	1300	1600	2050	2980	4000	5100
Air flow ¹ [scfm]	580	74	900	1300	1600	2050	2980	4000	5100
DewPoint under pressure [°F]	-4, -40, -100								
Minimum ambient temperature [°F]	32-0								
Nominal inlet air temperature [°F]	100°F (38°C)								
Max inlet air temperature [°F]	130°F (55°C)								
Nominal inlet air pressure [psig]	100 psig (7 barg)								
Max inlet air pressure [psig]	150 psig (10 barg)								
Inlet – outlet connections [NPT-F]	2"	2"	2½"	3" Flange	3" Flange	4" Flange	4" Flange	6" Flange	6" Flange
Adsorbent material -Type	Activated Alumina								
- Quantity Lbs (kg)	640 (292)	800 (363)	1000(454)	1400(636)	1800(818)	2400(1090)	3300(1500)	4500(2045)	5600(2545)
Standard electrical supply [V/Ph/Ht]	100-120V / 1 ph / 50-60Hz or 220-240 / 1 ph / 50-60Hz								
Electric nominal power [W]	50								
Level noise at 1 m [dbA]	> 85								
Weight [Lbs]	1150	1500	1800	2200	3700	4500	6000	7600	9500

¹ The nominal conditions refer to an inlet air pressure of 100 psig and a temperature of +100 °F.

3.1 INSTALLATION SITE



Particular care is required in selecting the installation site, as an improper location could directly effect the proper operation of the dryer.

This unit is not suitable to be used in explosive atmosphere, where risk of fire could exist, in presence of gaseous or solid polluting material, or outdoor exposed applications.



Don't use water to extinguish fire on the dryer or in the surrounding area.



Danger Hazard: Machine level noise could be higher than 85 dBA. Install the machine in a dedicated area where people are not normally present. The installer and/or end user is responsible for correct installation of the dryer, in order to prevent excessive noise exposure to the work environment. The installer and/or the end user is also responsible to install proper safety signs at the installation site.

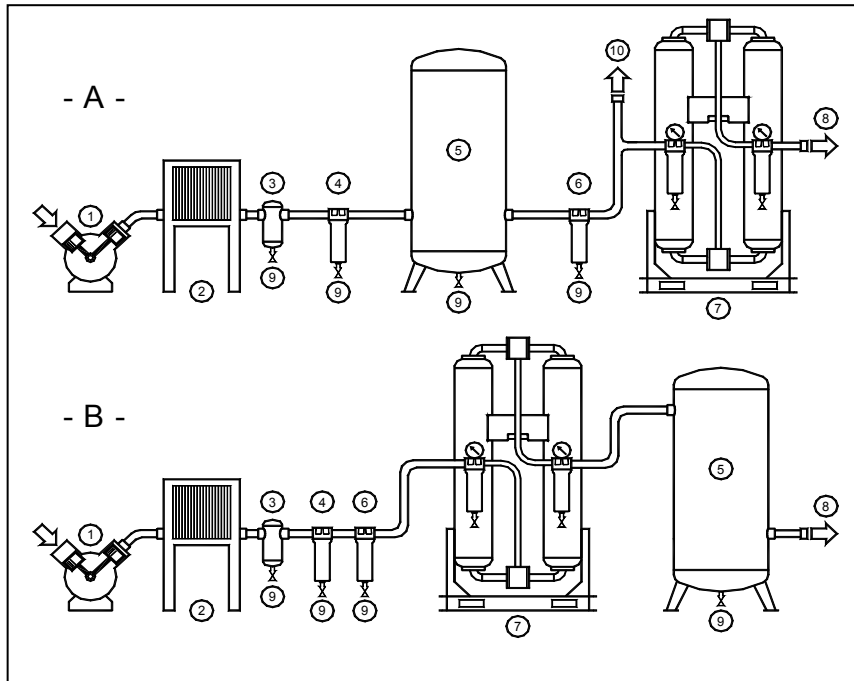


Danger Hazard: The technician that services the machine must wear hearing protection while servicing the dryer. Each employee must select proper PPD (Personal Protection Device) hearing protector (earmuffs, ear canal caps and earplugs) in order to prevent permanent hearing loss.

Minimal installation requirements:

- Select a clean, dry room free from dust, and protected from atmospheric disturbances.
- The supporting area must be smooth, horizontal and able to hold the weight of the dryer.
- Minimum ambient temperature +32 °F.
- Maximum ambient temperature +130 °F.
- Allow at least a clearance of 3 feet on each side of the dryer to facilitate possible maintenance operations.
- The dryer doesn't require to be fixed to the supporting surface.

3.2 INSTALLATION LAYOUT



- ① Air Compressor
- ② After Cooler
- ③ Condensate Separator
- ④ Filter 5 Micron
- ⑤ Compressed Air Tank
- ⑥ Filter 1 Micron
- ⑦ ACF Adsorption Dryer
- ⑧ Dry Air Outlet
- ⑨ BEKOMAT Zero Air Loss Condensate Drain
- ⑩ Wet Air Outlet



We recommend the dryer to be supplied with 0.01 micron filter on the inlet and a 25 micron filter on the outlet. It is recommended to install both 5 micron and 1 micron filters before the dryer, in order to protract the life of the inlet filter.

Type A installation suggests when the compressed air treated by the dryer is only a partial load of the total flow rate of the compressor; or when the compressor operates at reduced load and the total flow equals the compressor flow rate.

Type B installation suggests when the compressed air treated by the dryer is the total flow rate of the compressor; or when the air consumption can consistently change with peak values highly exceeding the flow rate of the compressors. In this case the capacity of the dry air receiver must be sized to compensate for the storage volume needed to cover these peak demands.

3.3 CORRECTION FACTORS

Correction factor for operating pressure changes:

Inlet air pressure	psig	60	70	80	90	100	110	120	130	140	150
Factor	F ₁	0.65	0.73	0.82	0.91	1.00	1.09	1.18	1.27	1.35	1.44

Correction factor for operating temperature changes:

Inlet air temperature	°F	80	85	90	95	100	105	110	115	120	130
Factor	F ₂	1.04	1.03	1.02	1.01	1.00	0.99	0.98	0.97	0.96	0.95

How to find the air flow capacity:

$$\boxed{\text{Air flow capacity}} = \boxed{\text{Nominal duty}} \times \boxed{\text{Factor (F1)}} \times \boxed{\text{Factor (F2)}}$$

Example:

An **ACF 220** has a nominal duty of **220 scfm**. What is the maximum allowable flow through for a dryer under the following operating conditions:

- Minimum inlet air pressure = 110 psig
- Maximum inlet air temperature = 110°F

Each item of data has a corresponding numerical factor which multiplied by the nominal duty determines the following :

$$\boxed{\text{Air flow capacity}} = \boxed{220} \times \boxed{1.09} \times \boxed{0.98}$$

= **235 cfm** → This is the maximum air flow rate that the dryer can accept under these operating conditions.

How to select a suitable dryer for a given duty:

$$\boxed{\text{Minimum Std. air flow rate}} = \boxed{\text{Design air flow}} \div \boxed{\text{Factor (F1)}} \div \boxed{\text{Factor (F2)}}$$

Example:

Given the operating parameters below:

- Design air flow = 235 cfm
- Inlet air pressure = 110 psig
- Maximum inlet air pressure = 110°F

In order to select the correct dryer model, the required flow rate is to be divided by the correction factors relating to above mentioned parameters:

$$\boxed{\text{Minimum Std. air flow rate}} = \boxed{235} \div \boxed{1.09} \div \boxed{0.98}$$

= **220 cfm** → Therefore the model suitable for the conditions above is **ACF 220 (220 cfm - nominal duty)**.

3.4 CONNECTION TO THE COMPRESSED AIR SYSTEM



Service to be performed by qualified personnel. The user is responsible to ensure that the dryer will never be operated with pressure exceeding the maximum pressure rating. Over-pressure could be dangerous both for the operator and the machine.

The air inlet temperature and the volume of air entering the dryer must comply with the limits reported on the data plate.

Installation precautions must be taken in order to limit the vibration which could occur during the operation. Therefore we recommend using flexible connecting pipes able to insulate the dryer from possible vibrations originating from the pipe line.

3.5 MAIN POWER CONNECTION



The connection to the main power is to be carried out by qualified personnel, and the safety protocol must comply with local rules and laws.

Before connecting the unit to the electric power, verify that the voltage and the frequency available on the mains correspond to the data on the data plate of the dryer. In terms of voltage, a $\pm 5\%$ tolerance is acceptable.

The wire size feeding the dryer must comply with the consumption of the dryer, while keeping into account also the ambient temperature, the conditions of the Main Power junction box, the length of the wire, and the requirements enforced by the local Power Provider.



It is mandatory to ensure the connection to the ground terminal.

3.6 INLET FILTER 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 collection system or container. The outlet condensate hose cannot be connected to pressurized systems.



Don't dispose the condensate into the environment.

The condensate collected in the dryer contains oil particles released in the air by the compressor. Dispose the condensate in compliance with the local rules.

We suggest installing a water-oil separator where all the condensate drains coming from compressors, dryers, tanks, filters, etc. feed into.

4.1 PRELIMINARY OPERATION



Verify that the operating parameters match with the nominal values reported on the data plate of the dryer (voltage, frequency, air pressure, air temperature, ambient temperature, etc.).

Before delivery, each dryer is submitted to accurate tests simulating real operating conditions. Nevertheless, the unit could be damaged during transportation. We therefore suggest checking the integrity of the dryer upon arrival and observing during the first hours of operation.



The start-up must be performed by qualified personnel.

It's mandatory that the engineer in charge will verify safe operational conditions complying with the local safety and accident prevention requirements.



The same engineer will be responsible for the proper and safe operation of the dryer. Never operate the dryer if the panels are not in place.

4.2 Purge Valve Adjustment

4.2 Purge Flow Control Valve – The Purge Flow Control Adjustment Valve must be set to the inlet pressure to 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 possible pressure.

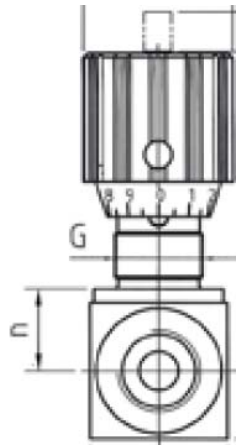
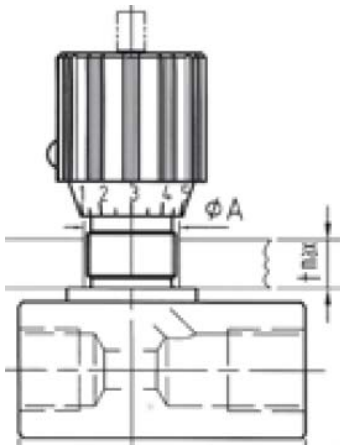
Factory Set at 100 psi Application Pressure

The procedure of adjustment of the Purge Control Valve is as follows:

On the knob stem of the Purge Control Valve are numbers from 1-9. A complete turn is turning the control knob a complete 360° (from number to number example: start at position #1 and turn until the one (1) completes a circle back to the #1 position)

The number of turns expressed in the table below is based on the number of turns from closed.

Example: ACF220 @ 100 psi = 7 Turns



1. Loosen set screw (flathead screwdriver)
2. Turn Purge Valve Clockwise until stop point (valve is closed).
3. Turn the Purge Control Valve Counter Clockwise 7 complete turns.
4. Tighten set screw (flathead screwdriver)

Consult Factory for Purge Adjustment

THE PURGE ADJUSTMENT MUST BE SET FOR THE APPLICATIONS PRESSURE

Servicing to be performed by a qualified person

4.3 FIRST START-UP



At the first start-up, or in case of start-up after a long inactivity period or following maintenance, the technicians must comply with the instructions given below. The start-up must be performed by qualified personnel.



The employee that operates the machine must wear hearing protection before to operate into the dryer. Each employee must select proper PPD (Personal Protection Device) hearing protector (earmuffs, ear canal caps and earplugs) in order to prevent permanent hearing loss.

Sequence of Operations:

- Verify the factory settings
- Verify that all the steps of the “Installation” chapter have been observed
- Verify that the connection to the compressed air system is correct.
- Verify that the condensate drain pipe is properly fastened and connected to a collection system or container
- Remove any packaging and other material which could obstruct the area around the dryer
- Pressurize the dryer slowly
- Turn ON the unit.
- Verify that the Controller is on
- Check the piping for air leaks
- Test the drain of the inlet filter
- After 2 minutes from the start-up the adsorption tower B will be depressurized
- Wait for the dryer to make a couple of cycles (there is an alternation of depressurization from tower A to tower B)
- The cycle is inverted every 2 minutes (DewPoint of -100°F) or every 5 minutes (DewPoint of -40°F) or every 7.5 minutes (DewPoint of -4°F); it depends on the dryer set-up

NOTE : During the first days of operation, the DewPoint can not be guaranteed because the adsorption material can contain humidity.

At the first start-up, or start-up after a long inactivity period, or following maintenance shutdowns, we recommend operating the dryer at a reduced nominal flow of 50% during the first two days.

4.4 OPERATION AND SWITCHING OFF



The user that intervenes to the machine must wear hearing protection before to operate on the dryer. Each employee must select proper PPD (Personal Protection Device) hearing protector (earmuffs, ear canal caps and earplugs) in order to prevent permanent hearing loss.



Operation :

- Pressurize the dryer slowly
- Turn ON the unit.
- Verify that the Controller is on
- Test the Pre-filter Drain
- During the first two minutes both the towers are pressurized
- Wait for the dryer to cycle at least 4 complete cycles before putting on-line.



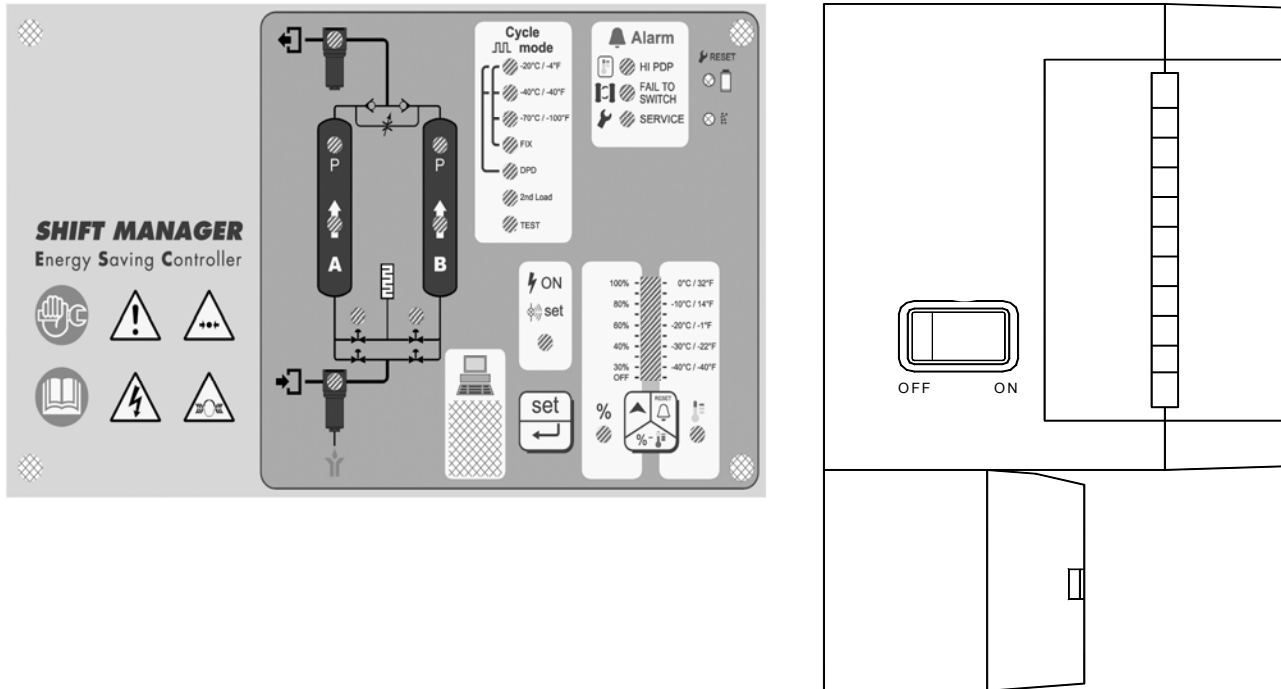
Switching off:

- Check if the inlet filter condensate drain works regularly
- Stop the air flow
- Depressurize the dryer
- Turn OFF the unit.

NOTE : During the operation of the dryer, both the towers are depressurized in order to be regenerated. A percentage of dried compressed air is purged through the offline column to regenerate. The noise of the compressed air during the purging is muffled by silencers.

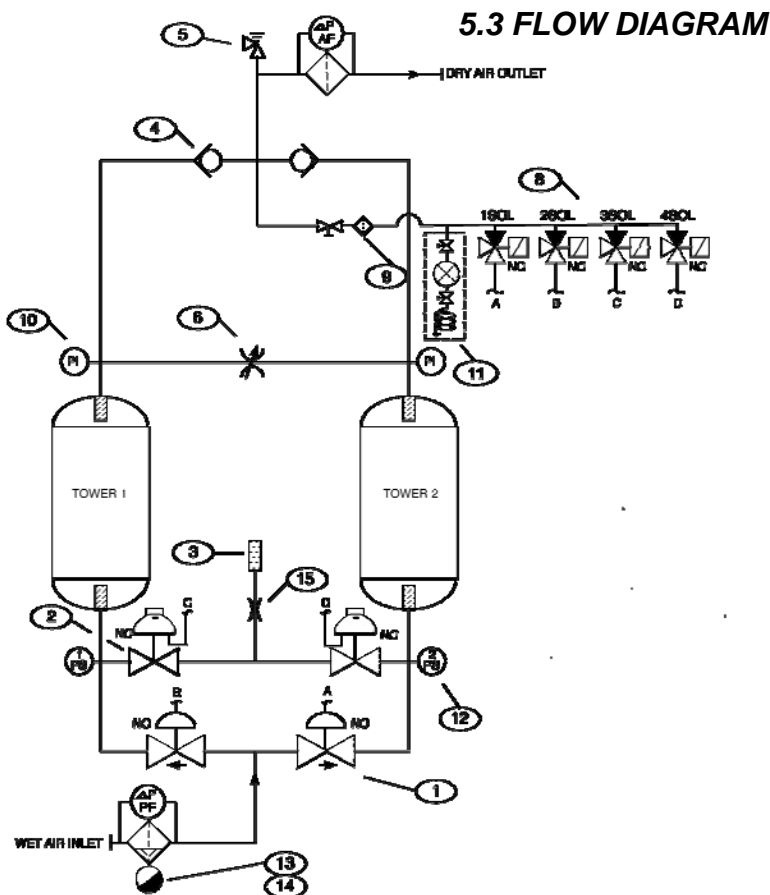
5.1 CONTROL PANEL

The only interface between the dryer and the operator is the control panel shown below.



5.2 Heatless Dryer Description

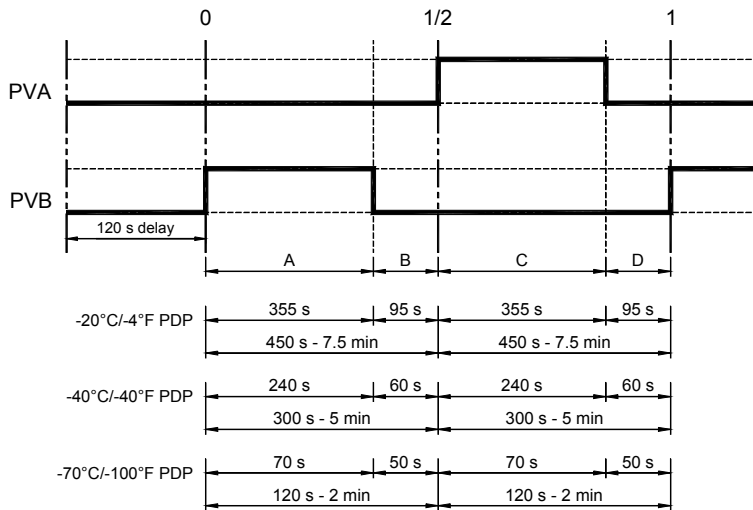
The ACF Heatless adsorption dryer series are fitted with two tanks, positioned parallel to one another and filled with adsorption material (Activated Alumina). While the compressed air is dried in one tower, the saturated desiccant is regenerated in the second. A minimum part of the already treated air is used for the regeneration process and expelled along with the condensate, through the silencers.



DET NAME

- | | |
|----|---------------------------|
| 1 | INLET VALVE |
| 2 | EXHAUST VALVE |
| 3 | EXHAUST SILENCER |
| 4 | OUTLET CHECK VALVES |
| 5 | PRESSURE RELIEF VALVE |
| 6 | PURGE CONTROL VALVE |
| 7 | CONTROLLER |
| 8 | SOLENOID BLOCK |
| 9 | PILOT AIR FILTER |
| 10 | TOWER PRESSURE GAUGES |
| 11 | DEWPOINT PROBE |
| 12 | PRESSURE SWITCH |
| 13 | PREFILTER DRAIN – BEKOMAT |
| 14 | PREFILTER DRAIN – FLOAT |
| 15 | BLOWDOWN LIMITER |

5.4 OPERATION



The cycle time is set during the manufacturing phase (as well as the regeneration nozzle) @ 100 psig Inlet Air Pressure, 100°F Inlet Air Temperature.

- 15 minutes for -4°F (-20°C)
- 10 minutes for -40°F (-40°C)
- 4 minutes for -100°F (-70°C)

Pressurization

During the start-up, both regeneration drain solenoid valves PVA and PVB (5 and 6) are closed (for 120 seconds (2 minutes) to guarantee the complete pressurization of the dryer.

Stage A The solenoid valve IVB is powered, which causes Column B Inlet Valve to close. The solenoid valve PVB (8) is powered so the tower B is depressurized. The compressed air flow is directed to tower A (1), where the desiccant material adsorbs the humidity down to the target Dew Point. Through the Purge Control Valve (6) a defined amount of dry air coming out from tower A is expanded into tower B. This dry air while crossing tower B, dries the adsorbent material dragging away the humidity through the PVB solenoid valve (2) and the silencers (3). At the end of this stage the adsorption material of tower B is completely regenerated.

Stage B The solenoid valve PVB (8) is closed and then through the Purge Control Valve (6) tower B is re-pressurized to the working pressure. The sum of stages A + B equals a half cycle time.

Stage C The solenoid valve IVA is powered, which causes Column B Inlet Valve to close. The solenoid valve PVA (8) is powered so tower A is depressurized. The compressed air flow is directed to tower B, where the desiccant material adsorbs the humidity up to the target Dew Point. Through the Purge Control Valve (6) a defined amount of dry air coming out from tower B is expanded into tower A. This air while crossing tower A, dries the adsorbent material dragging away the humidity through the PVA solenoid valve (2) and the silencers (3). At the end of this stage the adsorption material of tower A is completely regenerated.

Stage D The solenoid valve PVA (8) is closed and then through the Purge Control Valve (6) tower A is re-pressurized up to the working pressure. The sum of stages C + D equals a half cycle time. At the end, the cycle starts up again from Stage A.

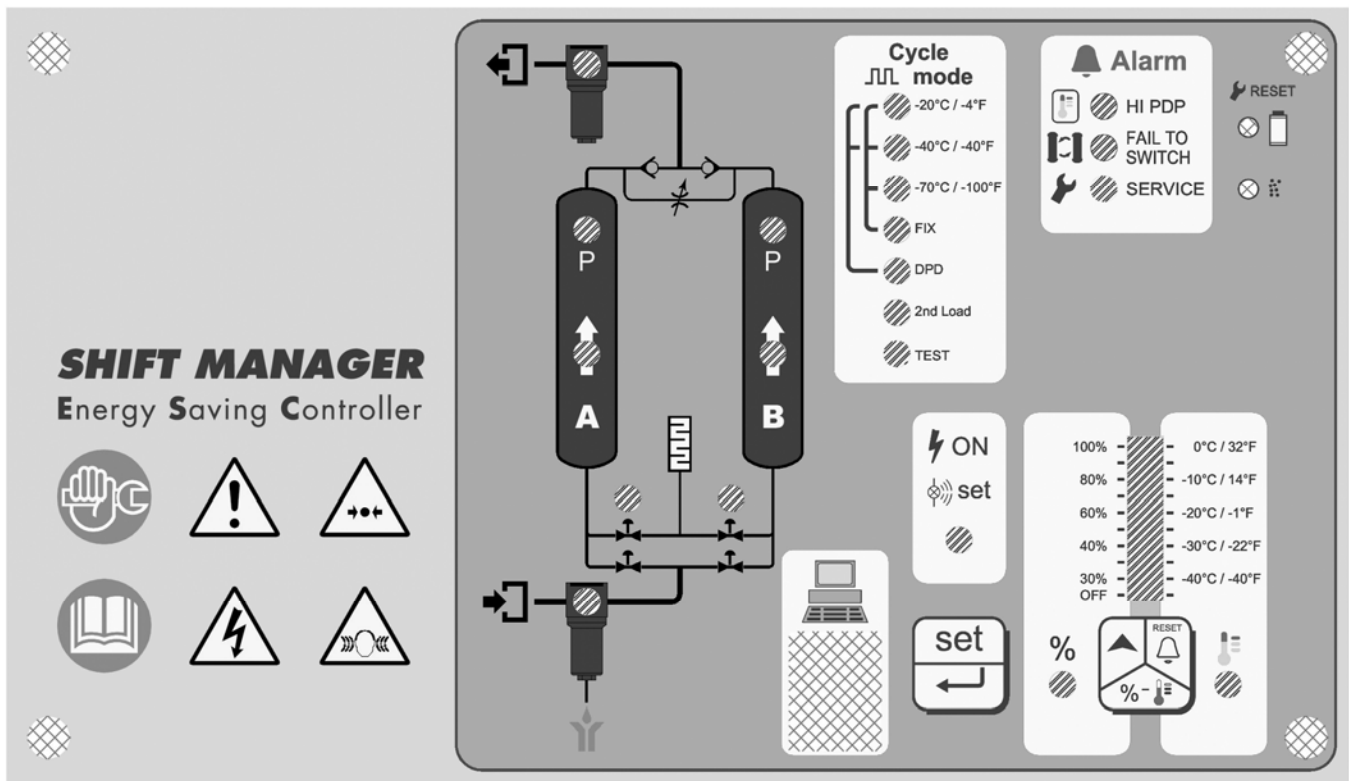
Note: The cycles are symmetrical therefore A=C and B=D

The desiccant material, if contaminated from lubricant oil, loses its adsorption propriety. Moreover during operation, the desiccant can release solid particles (powders) particularly abrasive and extremely damaging for the final users.

For this reason, it is recommended that the dryer is equipped with two high-efficiency filters:

- Inlet filter, 0.01 micron filtration grade, with differential gauge and electronic timed drain or electronic level drain.
- Outlet filter, 1 micron filtration grade, with differential gauge and manual drain.

5.5 ELECTRONIC Controller



	Key - On during programming		LED - On = tower under pressure
	Key - Test condensate drain / increase value / reset alarm		LED - On = inlet filter clogged
	LED - On = device powered		LED - On = outlet filter clogged
	- flashing = under programming		LED - Alarm: DewPoint too high
	LED - On = display shows % of set load		LED - Alarm: operating cycle did not switch
	LED - On = display shows DewPoint temperature		LED - Alarm: maintenance intervention
	LED - On = tower under adsorption		Key - reset cartridge replacement
	LED - On = air breathing solenoid valve regeneration open		Key - reset desiccant replacement

The correct operation of the dryer is controlled and monitored constantly by the Controller. The device carries out many functions:

- It displays the operating status through the Display LED panel
- It can be used to select the operating DewPoint
- It can be used to select the operating mode (FIX, DPD and TEST)
- It can be used to enable the “Energy Saver” function











5.5.1 DISPLAY PANEL – The LED DISPLAY panel is divided into four different display areas. Each one represents the specific functions of the dryer, more precisely:

1. The LEDs on the left, positioned on the **FLOW DIAGRAM**, represent the various operating phases of the dryer.
2. The LEDs of the “**Cycle mode**” menu display the operating mode of the dryer, selected by the operator during the programming phase (see specific paragraph).
3. The LEDs of the “**Alarm**” menu represent any ALARM and/or malfunctioning of the machine.
4. The LEDs and the **DISPLAY** on the right display the various load percentages & DEWPOINT.



Press the main switch of the device to switch on the LED .

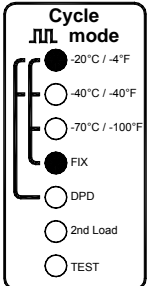
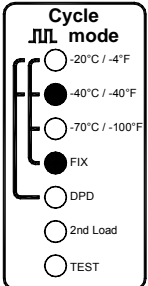
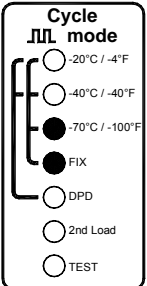
The LEDs on the flow diagram of the Display panel show the operating status of the dryer, precisely:

1. At **start up**, both the Exhaust (Purge) solenoid valves are closed (for about 120 seconds) therefore the relevant LEDs  are off. The compressed air passes into both drying towers, to pressurize the dryer and therefore the LEDs  are on.
2. After 120 seconds, the dryer starts the first operating cycle: "**Stage A**", tower B is de-pressurized, LED  switches off and the PVB solenoid valve is opened (LED  on) to vent the air used for the regeneration.
3. Afterwards, the dryer starts the "**Stage B**" re-pressurization of tower B, therefore solenoid valve PVB shuts down (LED  off). LED  switches on when the pressure switch reaches the calibration value (if the pressure-switch Kit is installed- optional).
4. When the towers equalize, the second part of the cycle time starts "**Stage C**", where tower A is de-pressurized, LED  switches off and the solenoid valve PVA is opened (LED  on) to vent the air used for regeneration.
5. The machine cycle ends with the re-pressurization, "**Stage D**" of tower A, the solenoid valve PVA closes (LED  off). LED  switches on when the pressure switch reaches the calibration value (if the pressure-switch Kit is installed- optional).

According to the selected operating mode (see paragraph DIP-SWITCHES) the following LEDs of the "**Cycle mode**" menu can be on:

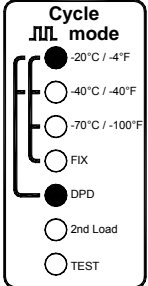
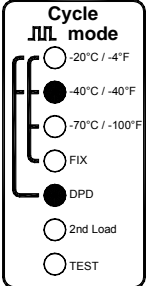
Mode : **FIX**

The dryer runs with fixed cycle times.

 <p>DewPoint under pressure PDP : -4°F (-20°C)</p>	 <p>DewPoint under pressure PDP : -40°F (-40°C)</p>	 <p>DewPoint under pressure PDP : -100°F (-70°C)</p>
--	---	--

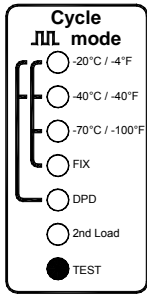
Mode: **DPD**

The dryer operates with cycle times proportional to the applied load (if the DewPoint probe is installed – optional). (@ -100°F Dewpoint Demand is not available)

 <p>DewPoint under pressure PDP : -4°F (-20°C)</p>	 <p>DewPoint under pressure PDP : -40°F (-40°C)</p>	
--	---	--

Mode: TEST

Diagnostic cycle, with step-by-step operation to make troubleshooting operations easier.



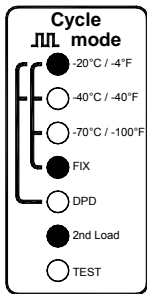
Mode :

FIX

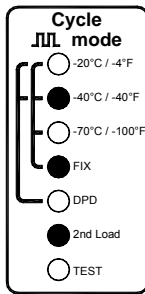
Function :

2nd Load

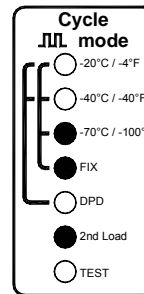
The dryer operates with fixed cycle times and allows the operator to choose, only on a Load/No-Load Compressors external contact, a second setting for the foreseen applied load (installation directly downstream of one or more than one compressor).



DewPoint under pressure PDP :
-4°F (-20°C)

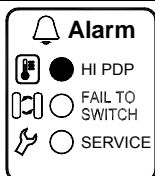


DewPoint under pressure PDP :
-40°F (-40°C)



DewPoint under pressure PDP :
-100°F (-70°C)

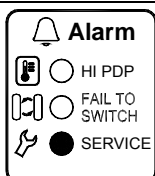
The display panel will show any ALARM and/or malfunctioning through the LEDs of the “Alarm” menu. The LEDs flash when the alarm is active and they stay on after the alarm is not active, but has not yet been reset. More precisely:




When the LED is flashing it means the alarm went off for a High DewPoint. The function can be activated only if the DewPoint probe is installed – optional – and only after having correctly set the relating DIP-SWITCH (see specific paragraph).




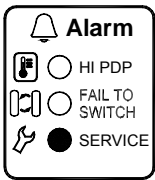
The LED flashes when the towers did not switch properly. This alarm is particularly important because it helps avoid further damage to the dryers. The function can be enabled only if the pressure switch kit is installed – optional – and only after having correctly set the relating DIP-SWITCH (see specific paragraph).



If the “SERVICE” LED and the  LED of the flow diagram are flashing at the same time, it means that the dryer inlet filter is clogged and therefore it must be replaced. This alarm does not affect the operation of the dryer, but maintenance is needed. Please refer to the User and Maintenance Manual of the filter itself.



If the “SERVICE” LED and the  LED of the flow diagram are flashing at the same time, it means that the dryer outlet filter is clogged and therefore it must be replaced. This alarm does not affect the operation of the dryer, but maintenance is needed. Please refer to the User and Maintenance Manual of the filter itself.



If the "SERVICE" LED and both LEDs of the flow diagram are flashing at the same time, the timer for the programmed maintenance of the filters has gone off.



If the "SERVICE" LED and both LEDs of the flow diagram are flashing at the same time, the timer for the programmed maintenance of the desiccant material has gone off.

When the LED is on, the 10 LED DISPLAY shows the load percentage of the "1st Load", set by the operator during the programming phase. By pressing the key , the DISPLAY shows the load percentage of the "2nd Load" and the LED of the "Cycle mode" menu lights up at the same time.

Press the key again and the 10 LED DISPLAY shows the DewPoint temperature read by the DewPoint meter (if installed); at the same time the LED lights up.

The chart below shows the values matching each LED of the DISPLAY :

LED N.	1	2	3	4	5	6	7	8	9	10
Display of load %	OFF	-	30	40	50	60	70	80	90	100
Display of DewPoint	32°F	23°F	14°F	5°F	-4°F	-13°F	-22°F	-31°F	-40°F	-50°F

Note : In DewPoint display, the intermediate temperatures are indicated by the two LEDs adjacent the value (for example at -27°F both LEDs 1 and 2 light up, or at -8°F LEDs 5 and 6 light up).

Note : In DewPoint display, LED 1 flashes for temperatures higher than +32°F, whereas LED 10 flashes for temperatures lower than -76°F. In case of anomalies on the probe all the LEDs switch off.

5.5.2 PROGRAMMING (SET-UP) LOAD % – Keep the key pressed for at least 2 seconds to access the

programming section, LED flashes to confirm access into the programming mode. To increase the displayed value, press the key . Press the key to memorize the new set value and move onto the next one (if the key is not pressed, the new parameter is not memorized).

The following parameters can be programmed:

Parameter	Display	Programmable value	Std. Value
1st Load	% LEDs and flash	30, 40, 50, 60, 70, 80, 90, 100 %	100 %
2nd Load	% LEDs , and flash	Between OFF and 100 %	100 %

To exit the programming mode, wait 1 minute or keep the key pressed for 2 seconds. The new parameters shall be used at the beginning of the first new operating cycle.

5.5.2 CALCULATING THE LOAD % – Calculating the load percentage to set on the Controller device is a very important operation because it helps save energy. The operator must calculate the percentages very carefully, considering that the operator is aware of the max. Max. Air Load inlet air temperature, as well as the real minimum pressure during operation.



Only qualified personnel can set the loads. If the load % is too low, the desiccant material will get saturated because of the shorter regeneration time. The manufacturer cannot be held responsible for any malfunctioning of the dryer in the case of wrong operating settings.

To determine the load percentages to set on the device, refer to the following example, if the real operating parameters are known.

EXAMPLE:

- Max. load of compressed air requested upon operation = 220 cfm
- Real minimum pressure during operation = 110 Psig ($\rightarrow F_1=1,09$)
- Max. inlet air temperature = 110°F ($\rightarrow F_2=0.98$)
- Installed dryer = ACF 220

With reference to paragraph 2.4 “CORRECTION FACTORS,” the real load applied to the dryer equals:

$$\text{Real load} = 235 / F_1 / F_2 = 220 / 1.09 / 0.86 = 235 \text{ cfm}$$

$$\text{Load \% actually applied} = 220 / 235 \times 100 = 90 \%$$

To optimize the operation of the dryer, the operator must set a load of the 1st Load equal to 90% on the 10 LED display of the device (from LED N. 8 of bar). As indicated above, slightly round up the set percentage to ensure the correct use and preservation of the desiccant material. The instructions indicated previously can also be applied to the 2nd Load.

5.5.3 OPERATION CONFIGURATION – The electronic board, indicated below and positioned inside the Controller, allows for the adjustment and control of the main operating parameters.



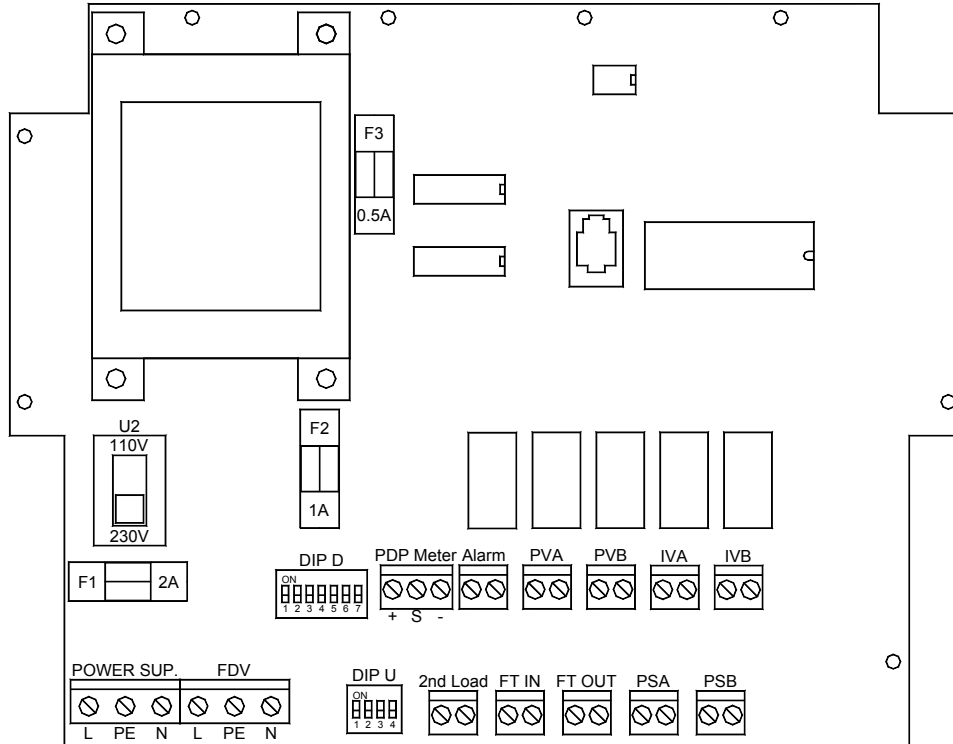
Only qualified personnel must configure the dryer.

Before any service, verify that:

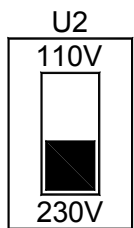
- **No part of the machine is powered** and that it cannot be connected to the mains supply.
Access the part by removing the terminal board cover.



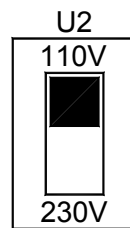
Any modifications to the operating configuration not compatible with the ones recommended by the manufacturer can cause malfunctioning, possible damages to parts of the machine and a premature deterioration of the adsorbent material and of the inlet and outlet dryer filters.



5.5.3.1 POWER SELECTOR – The Controller is able to operate with different voltage ranges (100-120V/50-60Hz or 220-240V/50-60Hz). Before starting up the machine it is necessary to open the device and verify that the U2 switch of the electronic board is set to the correct supply voltage:



With the switch in the lower position, the Controller must be powered at 220-240 V.



With the switch in the upper position, the Controller must be powered at 110-120 V.



The automatic drain on the filter at the dryer inlet is supplied according to the power voltage indicated in the order; verify its compatibility with the former settings and match with the plate data.

5.5.3.2 DIP-SWITCHES – The Controller board is fitted with two series of DIP-SWITCHES that are set during the dryer test phase. If there are specific functional or control requirements, the Customer has the possibility of changing the operating parameters, by simply changing the set-up of the DIP-SWITCHES.



Only qualified personnel can perform the adjustment interventions.

Before any service verify that:

- **The machine has no parts under power and** that it cannot be re-connected to the Power.
The modification to the operating parameters through the variation of the position of the DIP-SWITCHES will be active only when the dryer starts up again.

The second series of DIP-SWITCHES (DIP D) allows for the setting of the following parameters:

DIP D		
	DIP D1 and DIP D2 : Selecting the operating cycle. The dryer can operate according to different operating cycles, according to the requested DewPoint or according to a diagnostic cycle (see specific paragraph).	1 OFF and 2 OFF = Cycle -40°F 1 ON and 2 OFF = Cycle -100°F 1 OFF and 2 ON = Cycle -4°F 1 ON and 2 ON = Cycle Test
	DIP D3 : DPD Cycle. It can be used to start the operating mode with cycle times proportional to the applied load (if the second DewPoint probe is installed-optional). Priority must be given to the selection of DIPs D1 and DIP D2.	OFF = Not enabled (standard) ON = Enabled
	DIP D4 : HI PDP alarm. It can be used to set off the alarm for a very high DewPoint (if the DewPoint probe is installed- optional).	OFF = Not enabled (standard) ON = Enabled
	DIP D5 : Use. It can be used to modify the internal maintenance timer, selecting a work cycle up to 3000 hours/year or higher (see specific paragraph “MAINTENANCE”).	OFF = up to 3000 hours/year (standard) ON = over 3000 hours/year
	DIP D6 : Not used.	-
	DIP D7 : DewPoint probe.	OFF = probe disabled ON = probe enabled (standard)

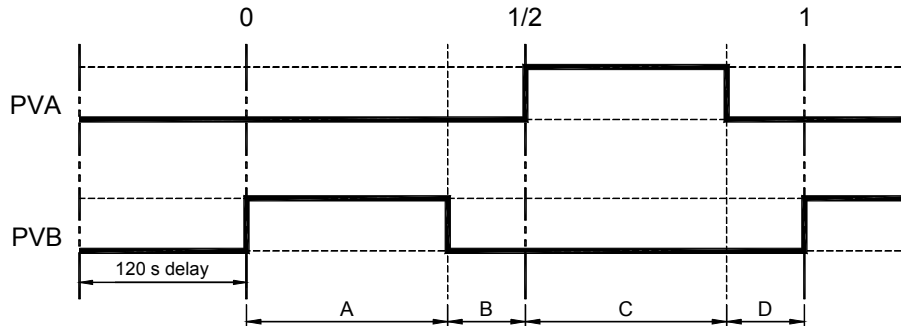
The first series of (DIP U) allows for the setting of the following parameters:

DIP U		
	DIP U1 : Pressure. The Controller can operate with two different pressure ranges, according to the operating limits used to design the dryer (Standard Max. 150 psig; optional Max. 232 psig).	OFF = Low pressure - Max. 150 psig (standard) ON = High pressure - Max. 232 psig
	DIP U2 : Fail to switch alarm. It can be used to enable the pressure switches to control the “Fail to Switch alarm” function.	OFF = Not installed (standard) ON = Installed
	DIP U3 : FT Filter Management. Two differential gauges are connected to the inlet and outlet filters. They show the level of clogging of the cartridge and through an electric contact they transfer this signal to the Controller. The signal can be managed like a normally closed contact (pos. OFF) or an open contact (pos. ON).	OFF = contact closed → filter OK (standard) ON = contact open → filter OK (reverse)
	DIP U4 : Not used.	-

5.5.4 OPERATING CYCLES – As described previously, the dryer can operate according to three different operating modes: FIX, DPD and TEST.

5.5.4.1 FIX – In FIX mode, the cycle times are managed according to the following operating parameters:

- required DewPoint (-4°F, -40°F, -100°F);
- set load percentage (OFF ... 100%);
- Maximum dryer pressure (Max. 150 psig)



The table below shows the cycle times according to the operating configuration of the dryer:

Load	Low pressure						High pressure					
	-20°C/-4°F		-40°C/-40°F		-70°C/-100°F		-20°C/-4°F		-40°C/-40°F		-70°C/-100°F	
	Time A	Time B	Time A	Time B	Time A	Time B	Time A	Time B	Time A	Time B	Time A	Time B
[%]	[s]	[s]	[s]	[s]	[s]	[s]	[s]	[s]	[s]	[s]	[s]	[s]
100	355	95	240	60	70	50	270	180	180	120	46	74
90	320	130	217	83	64	56	244	206	163	137	42	78
80	285	165	193	107	57	63	217	233	145	155	38	82
70	251	199	170	130	51	69	191	259	128	172	34	86
60	216	234	147	153	45	75	165	285	111	189	30	90
50	181	269	124	177	39	82	139	312	94	207	27	94
40	146	304	100	200	32	88	112	338	76	224	23	97
30	111	339	77	223	26	94	86	364	59	241	19	101
OFF	0	450	0	300	0	120	0	450	0	300	0	120

Note: Time A = Time C and Time B = Time D

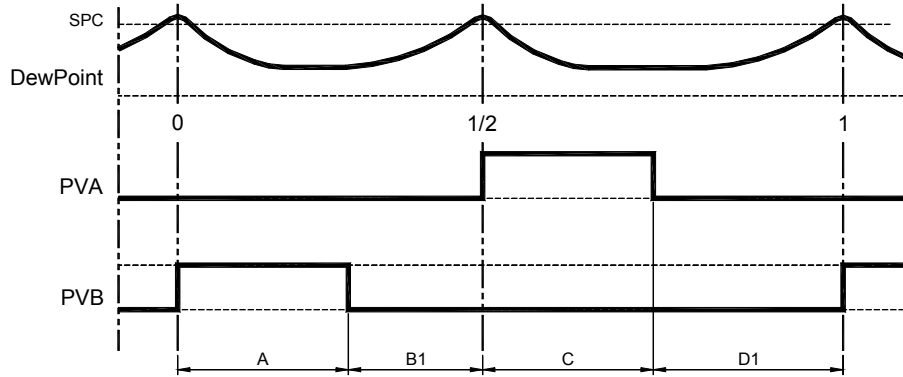


If the default configuration is changed, verify that the Purge Valve is adjusted to the inlet air pressure for the new settings.

5.5.4.2 DPD –The DPD cycle (DewPoint Demand) is used to adapt the cycle times, that is the quantity of air needed for the regeneration, to the real load applied to the dryer. It is necessary to install a DewPoint meter (PDP Meter - optional) to achieve this.

Set the DIP D3 ON and the DIP D7 on ON. The DPD mode can be selected only for DewPoints of -4°F and -40°F (set the requested condition on DIP D1 and DIP D2).

After the first four operating cycles following machine start-up, run in FIX mode, the Controller starts operating in DPD mode according to the following diagram:



- A = Regeneration time of tower A (fixed)
- B1 = Re-pressurization time/stand-by tower A (variable)
- C = Regeneration time of tower B (fixed)
- D1 = Re-pressurization time/stand-by tower B (variable)
- SPC = Switching Set-Point (-4°F or -40°F)
- A = C B1 can be different from D1 A + B1 + C + D1 = Complete cycle

While tower A is operating, tower B is regenerated for the set time C (fixed), determined by the selected operating cycle (see the table of the programmed values below). At the end of the regeneration phase, tower B is re-pressurized and kept in stand-by until the DewPoint meter (PDP Meter) indicates that the nominal value has been reached in the tower (SPC) and activates the Controller device for the switching of the towers. The process is repeated in the same way when tower B is operating.

	Low pressure		High pressure	
	-20°C/-4°F	-40°C/-40°F	-20°C/-4°F	-40°C/-40°F
Time A = C [s]	355	240	270	180
Minimum value Time B1 and D1 [s]	95	60	180	120

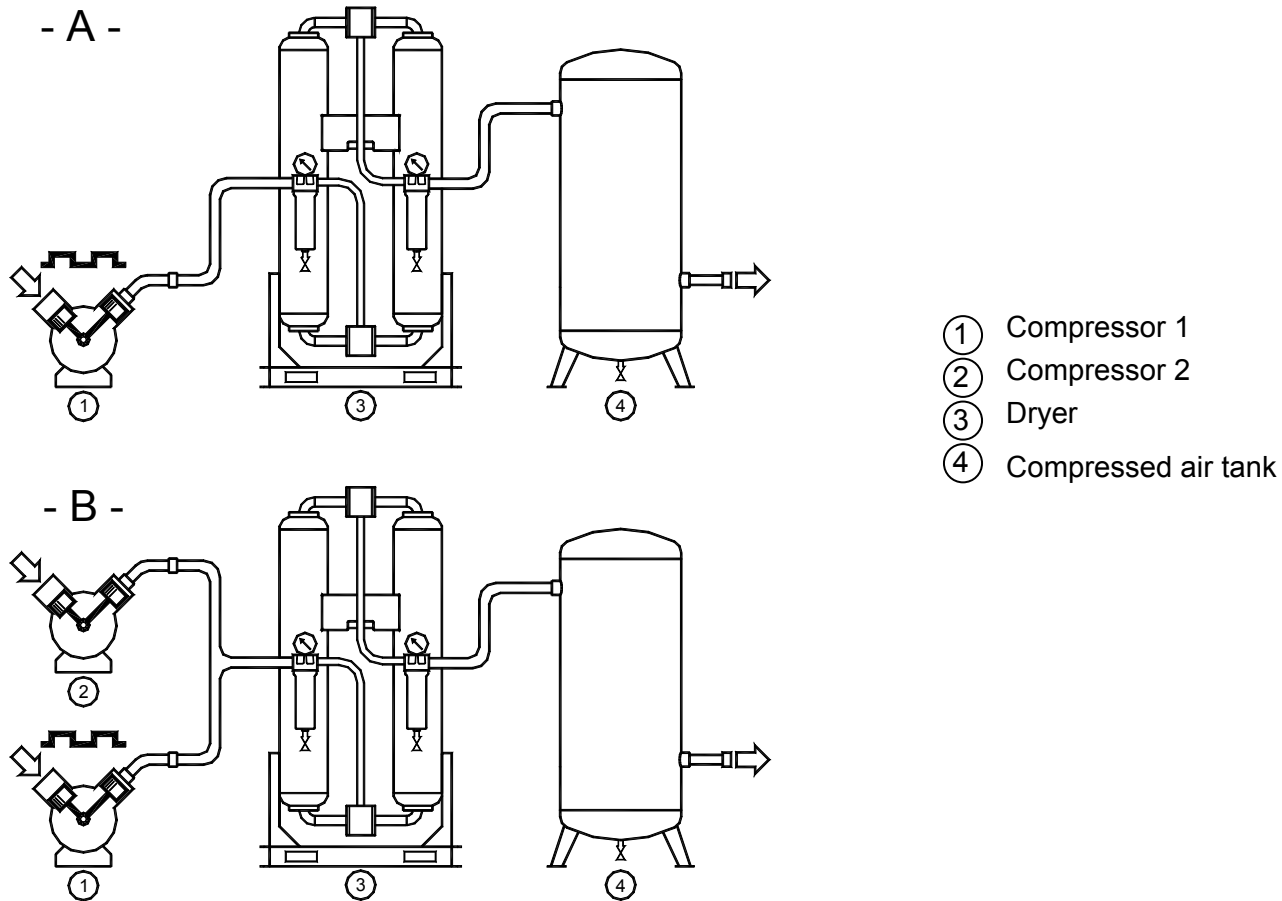
Even if the DewPoint found is lower that the set SPC value; the towers switch every 30 minutes. If the applied load is close to the nominal load, the Controller device automatically moves to FIX mode (the LED **○**FIX shows that this mode has been enabled, and it remains on together with the LED **○**DPD), and returns to DPD mode when the DewPoint values drop again below the SPC value.



In case of defects and/or troubles with the PDP Meter, the Controller device automatically enters FIX mode.

5.5.4.3 FIX - 2ND LOAD – The Controller allows for the management of a further load condition, through the digital input “2nd Load” on the electronic board; the value of the parameter “2nd Load” is enabled by closing a clean electric contact (volt free).

This function can be activated only in FIX mode and it can be used to control the intermittent operation of just one compressor, or a second compressor installed upstream of the dryer.



Type -A- installation (just one intermittent compressor), two different load conditions can be set, one matches the load actually applied and the second is set for the lack of load – OFF. Therefore, as soon as the compressor switches off, the dryer stops the last operating cycle and moves into stand-by position.



Type -B- installation (two compressor installed upstream of the dryer), the first load condition is kept for the sum of the loads of the two compressors, whereas the second is used for the operation of the system with just one active compressor (for example compressor 1). To calculate the actual % of load applied, both of the “1st Load” and “2nd Load” refer to paragraph 5.5.2.1, first using the real load sum of the loads of the two compressors and then the real load of compressor 1 only.




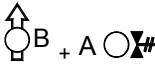

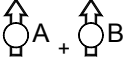

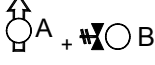

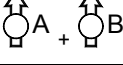
The connection and the set-up of the loads in the “2nd Load” mode must be carried out by qualified personnel only. If the load % is too low, the desiccant material would deteriorate quickly because it would be regenerated for shorter periods of time. The manufacturer cannot be held responsible for malfunctioning if the operating parameters have been set incorrectly.

5.5.4.4 TEST – The dryer can operate following a diagnostic cycle, with step-by-step operation, to make troubleshooting or ordinary maintenance interventions easier.

Through this operating cycle the dryer runs the nine phases (from step 1 to step 9) that form the entire operating cycle.

To access the TEST cycle first set the relating DIP-SWITCHES (DIP D1 and DIP D2) to position ON; this condition will be displayed by the flashing “O TEST” LED on the “Cycle mode” menu of the instrument. The first LED indicating the first step lights up on the DISPLAY; by pressing the  key, the dryer moves onto the following step until it reaches step 10. By pressing the key again , the dryer starts from step 1 again.

The table below shows the various steps of the dryer:

10	— 10	All the LEDs	Check operation of LEDs of Controller					
9	— 9		Line pressure	Line pressure	Closed	Closed	Not powered	Not powered
8	— 8		< 5 psig	Line pressure	Open	Closed	Powered	Not powered
7	— 7		Line pressure	Line pressure	Closed	Closed	Not powered	Not powered
6	— 6		Line pressure	Line pressure	Closed	Closed	Not powered	Not powered
5	— 5		Line pressure	Line pressure	Closed	Closed	Not powered	Not powered
4	— 4		Line pressure	< 5 psig	Closed	Open	Not powered	Powered
3	— 3		Line pressure	Line pressure	Closed	Closed	Not powered	Not powered
2	— 2		Line pressure	Line pressure	Closed	Closed	Not powered	Not powered
1	— 1	No LED	Start diagnostic cycle					
STEP	LED On on DISPLAY	[On] Status of LED	A Status of towers	B Status of towers	PVA Breather solenoid valve	PVB Breather solenoid valve	PVA Elect. Breather coil	PVB Elect. Breather coil


5.5.5 MAINTENANCE (SERVICE) – The adsorption dryer requires a preventative maintenance which entails the replacement of the inlet and outlet filter and the desiccant material. The DIP D5 allows the service interval on the unit to be adjusted: OFF up to 3000 hours/year, on ON over 3000 hours/year.

The Controller will then count the number of working hours and will activate the maintenance alarms when certain values are reached. See table below:



	DIP D5 = OFF		DIP D5 = ON	
	Alarm	Following reminder	Alarm	Following reminder
Filter IN	Every 3000 hours	Every 600 hours	Every 4000 hours	Every 800 hours
Filter OUT				
Desiccant material	Every 9000 hours	Every 1000 hours	Every 12000 hours	Every 1500 hours

The maintenance alarms (reminder) do not change in any way the operation of the Controller.

5.5.5.1 MAINTENANCE (SERVICE) RESET

To have a **temporary reset** of the maintenance alarms (reminder) keep the  pressed for at least 2 seconds. Maintenance alarms (reminder) will appear again after “following reminder” hours as above listed.

To perform a **full reset** of the maintenance alarms (reminder) :

- Of the filters (IN and OUT) keep pressed for at least 5 second the button  (use a small tool to enter into the hole of the control panel)
- Of the desiccant material keep pressed for at least 5 second the button  (use a small tool to enter into the hole of the control panel)

5.5.5.2 FUSES – Three different safety fuses are fitted on the electronic board, in positions F1, F2 and F3. The fuses protect the following circuits:

F1 = (2A type “T” ø5x20 mm) → mains;

F2 = (1A type “T” ø5x20 mm) → condensate drain solenoid valve;

F3 = (0,5A type “T” ø5x20 mm) → control logic.



The fuses can blow if there are any problems with the dryer. In this case, replace them, after solving the problem that caused the malfunction. Also refer to the specific paragraph “TROUBLESHOOTING”.



5.5.5.3 SERIAL COMMUNICATION – The Controller is fitted with a serial port RJ 45 (with signal type RS 232) which allows for the connection to a network controlled by a PC (Personal Computer) or a PLC (Programmable Logic Control).

The dryer can make the following information available:

1. Operating conditions.
2. Operating parameters.
3. Alarms.
4. Time remaining before the next programmed maintenance intervention.



To transfer the information above, no interface hardware is necessary. Simply ask your distributor/dealer for the dedicated protocol.

If you wish to permanently connect the dryer to a monitoring network, there is also a 2 pole terminal on the electronic board of the controller (see illustration below) which can be connected through a bi-polar cable to the PC or the PLC.



Only qualified personnel must carry out the service for the serial connection of the dryer. Before any service make sure that:

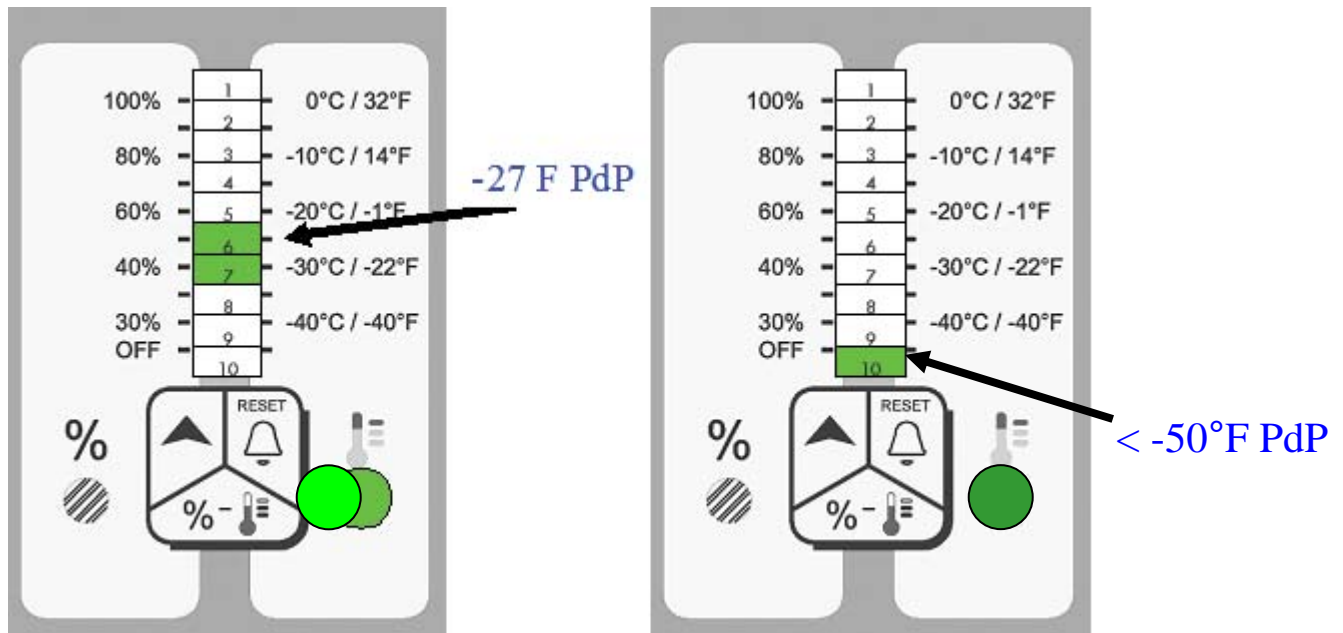
- **No parts of the machine are powered.**

5.6 PLUS VERSION (Dewpoint Demand) - (OPTIONAL)

The Controller has an analog input 4-20mA which the DewPoint meter is connects to (PDP Meter) and a sampling system.

By installing the DewPoint sensor it is possible to:

- Show the DewPoint value on the display of the Controller device;
- Enable the operation of the dryer in DPD mode (see paragraph 5.5.4.2 DPD);
- Enable the HI PDP alarm
(see paragraph 5.5.3.2 DIP-SWITCHES).

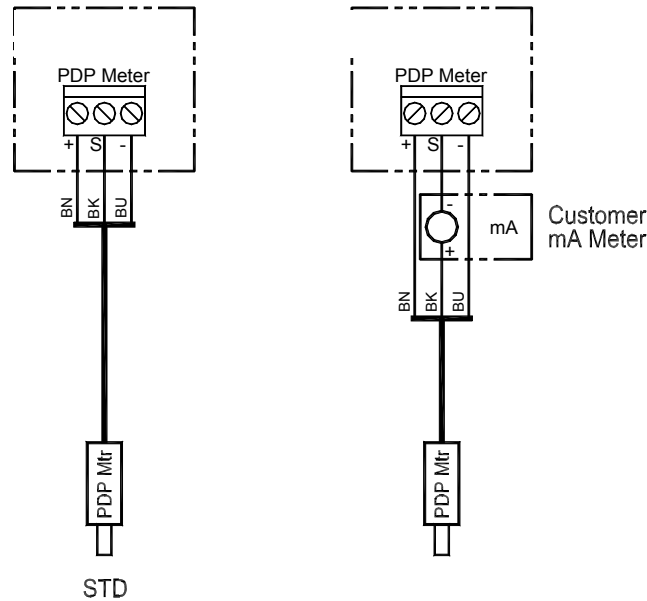


LED N.	1	2	3	4	5	6	7	8	9	10
Display of DewPoint	32°F	23°F	14°F	5°F	-4°F	-13°F	-22°F	-31°F	-40°F	-50°F
Note : In DewPoint display, the intermediate temperatures are indicated by the two LEDS adjacent the value (for example at -27°F both LEDs 7 and 8 light up, or at -8°F LEDs 5 and 6 light up).										
Note : In DewPoint display, LED 1 will flash for temperatures higher than +32°F, whereas LED 10 flashes for temperatures lower than -76°F. In case of anomalies on the probe all the LEDS switch off.										

The sampling system includes a measurement chamber which holds the DewPoint meter's sensor (PDP Meter). A constant flow of compressed air must flow through the cell (about 2 liters/minute) which is factory set, taken from the operating online column.

5.6.1 PDP ANALOG SIGNAL– In the standard PLUS installation, the analog signal supplied by the Dewpoint Probe is used only by the Controller. The user has the possibility to use the analog signal 4-20mA for any other operation (such as the monitoring of the dewpoint level, etc).

Just simply put the mA meter (or connection to a scaling temperature display module) on terminal S of the Controller, as shown in the following illustration. The signal variation ranges between 4mA (-122°F) and 20mA (+68°F), whereas the measurement range of the device is reliable in the interval between -76°C and +68°C.

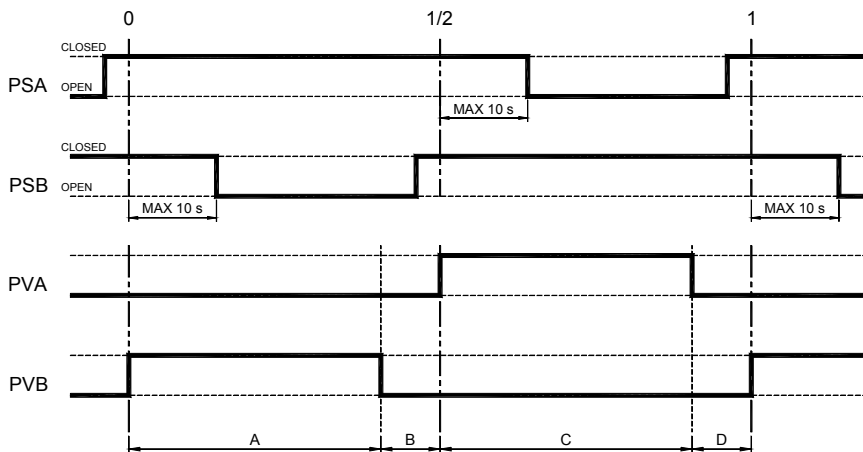


5.7 PRESSURE SWITCHES OF “FAIL TO SWITCH ALARM” - (OPTIONAL)

A pressure switch is installed on each tower (PSA and PSB respectively) to enable the “FAIL TO SWITCH ALARM” function of the Controller. The PSA pressure switch is closed when tower A is under pressure and PSB is closed when tower B is under pressure.

The system is able to detect an alarm condition if, for any reason, the flow between the two towers was not switched or the switching was not done correctly.

The “Fail to Switch alarm” function is enabled by positioning the DIP U2 on ON (also refer to paragraph 5.5.3.2 “DIP-SWITCHES”).



- Point 0 : PSA must already be closed, and PSB must open in a maximum time of 10 seconds.
- Point 1/2 : PSB must already be closed and PSA must open in a maximum time of 10 seconds.
- Point 1 = Point 0 (the cycles are repetitive) .

5.7.1 CALIBRATION PRESSURES – The calibration values of the pressure switches are indicated below:

Failure to Switch Alarm Pressure Switches are Factory Calibrated: 50 psig Set Point

- Normally Open (NO) configuration.

6.1 CONTROLS AND MAINTENANCE



The service must be carried out by qualified person.

Before any Service, verify that:

- **Disconnect Power following Lock-out/Tag-out procedures.**
- **De-pressurize unit.** Ensuring unit is isolated from compressed air system.



The user that services the machine must wear hearing protection before to operate into the dryer. Each employee must select proper PPD (Personal Protection Device) hearing protector (earmuffs, ear canal caps and earplugs) in order to prevent any uneasiness that could cause dangerous situation for him.



DAILY

- Check if the inlet filter condensate drain works regularly.
- Check the clogging state of the filters by reading the differential pressure gauge installed.
- Check that the tower switching operation takes place correctly and in the set cycle times.
- Check that the differential pressure gauge, of the regenerating tower, indicates 0 bar.



YEARLY

- Replace the inlet and outlet filter cartridge elements.
- Replace Silencers.
- Install Pre-Filter Drain Service Kit (or Replace Float Drain)
- Calibrate DewPoint Probe.
- Check if the regeneration drain solenoid valves (PVA &PVB) work regularly.
- Check if all screws of the electrical wiring are correctly tightened.
- Verify operation of the dryer.



EVERY 2 YEARS

In addition to the programmed maintenance, every year:

- Install Inlet & Purge Exhaust Valve Service Kit
- Verify operation of the dryer.



EVERY 3 YEARS

In addition to the programmed maintenance, every year:

- Replace the desiccant 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.

- Verify operation of the dryer.

6.2 TROUBLESHOOTING



The troubleshooting and the eventual checks have to be performed by qualified personnel. **We suggest enabling the TEST modality to make troubleshooting operations easier (see paragraph 5.5.4.4) and gradually verify that the operating steps are performed correctly.**





The technician that services the machine must wear hearing protection while servicing the dryer. Each employee must select proper PPD (Personal Protection Device) hearing protector (earmuffs, ear canal caps and earplugs) in order to prevent permanent hearing loss.












PROBLEM

POSSIBLE CAUSE - SUGGESTED ACTION

- ◆ High DewPoint
 - ⇒ The dryer is off - switch it on.
 - ⇒ The dryer has just been started up and the adsorption material can contain moisture – use the dryer at a reduced nominal flow of 50% for at least 2 days and verify the correct operation of the machine.
 - ⇒ The dryer does not cycle – see specific paragraph.
 - ⇒ The inlet air is too hot - restore the nominal conditions.
 - ⇒ The inlet air pressure is too low – verify that the Purge Valve is Adjusted for the real 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 - restore the nominal conditions.
 - ⇒ Inlet filter does not drain the condensate – check the proper operation of the drain.
 - ⇒ The pressure gauge of the tower under regeneration shows a pressure higher than 0
 - Silencers are clogged – clean or replace them.
 - Failed Inlet or Exhaust Valves – Replace or Service.
 - ⇒ Cycle time on Electronic Controller has been modified – restore the nominal times.
 - ⇒ Desiccant material is exhausted - replace.
- ◆ Solenoid valve PVA and/or PVB are never activated.
 - ⇒ Check for mains failure.
 - ⇒ Verify the electric wiring.
 - ⇒ Verify fuses on Electronic Controller.
 - ⇒ The valve is blocked – open and clean it.
 - ⇒ The coil of the solenoid valve burned out - replace it.
- ◆ Dryer does not Cycle
 - ⇒ Solenoid valve PVA and/or PVB are never activated - see specific point.
 - ⇒ Check operation of Inlet & Purge Exhaust Valves
- ◆ All the inlet air is discharged through the silencers.
 - ⇒ The dryer does not cycle - see specific point.
 - ⇒ The Pilot Air Solenoids is blocked – Check for output air signal.
 - ⇒ Exhaust Valve PVA and/or PVB are blocked – open and clean it.
 - ⇒ Inlet Valve IVA and/or IVB are blocked – open and clean it.
 - ⇒ The Electronic controller always supplies solenoid valve PVA and/or PVB – verify the electric wiring and if necessary replace.
 - ⇒ The cycle times on them Electronic controller have been changed – restore nominal conditions.
 - ⇒ Purge Adjustment Valve is clogged – open and clean it.
- ◆ Liquid comes out of the silencers.
 - ⇒ High Dewpoint – see specific paragraph.

- ◆ LED  ○ “HI PDP” of the Controller flashes or is on. ⇒ The probe of the DewPoint Meter (optional) detects a high DewPoint, for one of the following reasons:
 1. High Dewpoint – see specific paragraph.
 2. Pilot Air Filter is blocked - replace it.
 3. Verify the electric connection of the probe.
 4. The probe is not calibrated – contact the dealer.
 5. The probe is broken – replace it.
 6. There is an air leak on the tubing and/or joints that connect the equipment – verify the connections and replace the damaged parts.
 7. A pipe or a joint which connects the equipment is clogged – replace it.

- ◆ The LED  ○ “FAIL TO SWITCH” of the Controller flashes or is on. ⇒ The pressure switches (optional) for the “FAIL TO SWITCH” function, show an alarm during the tower switching process, for one of the following reasons:
 1. The dryer does not run the switching cycle – see specific paragraph.
 2. All the inlet air is purged through the silencers – see specific paragraph.
 3. The solenoid valve PVA and/or PVB is never enabled – see specific paragraph.
 4. The pressure switches are not calibrated – reset the default settings (see paragraph 5.7).
 5. There is an air leak on the tubing and/or joints that connect the equipment – verify the connections and replace the damaged parts.
 6. A pipe or a joint which connects the equipment is clogged – replace it.

- ◆ The LED  ○ “SERVICE” of the Controller flashes or is on. ⇒ The dryer needs maintenance (also refer to paragraphs 5.5.1 “DISPLAY PANEL” and 6.3 “CONTROLS AND MAINTENANCE”), more precisely :
 1. If the LED “SERVICE” flashes together with the LED  , it means that the inlet filter of the dryer is clogged – replace the filtering element (cartridge).
 2. If the LED “SERVICE” flashes together with the LED  , it means that the outlet filter of the dryer is clogged – replace the filtering element (cartridge).
 3. If the LED “SERVICE” flashes together with both LEDs   -   the filter programmed maintenance timer went off – replace the filtering elements (cartridges).
 4. If the LED “SERVICE” flashes together with both LEDs  A -  B the adsorbent material programmed maintenance timer went off – replace the desiccant bed.

6.3 SUGGESTED SPARE PARTS

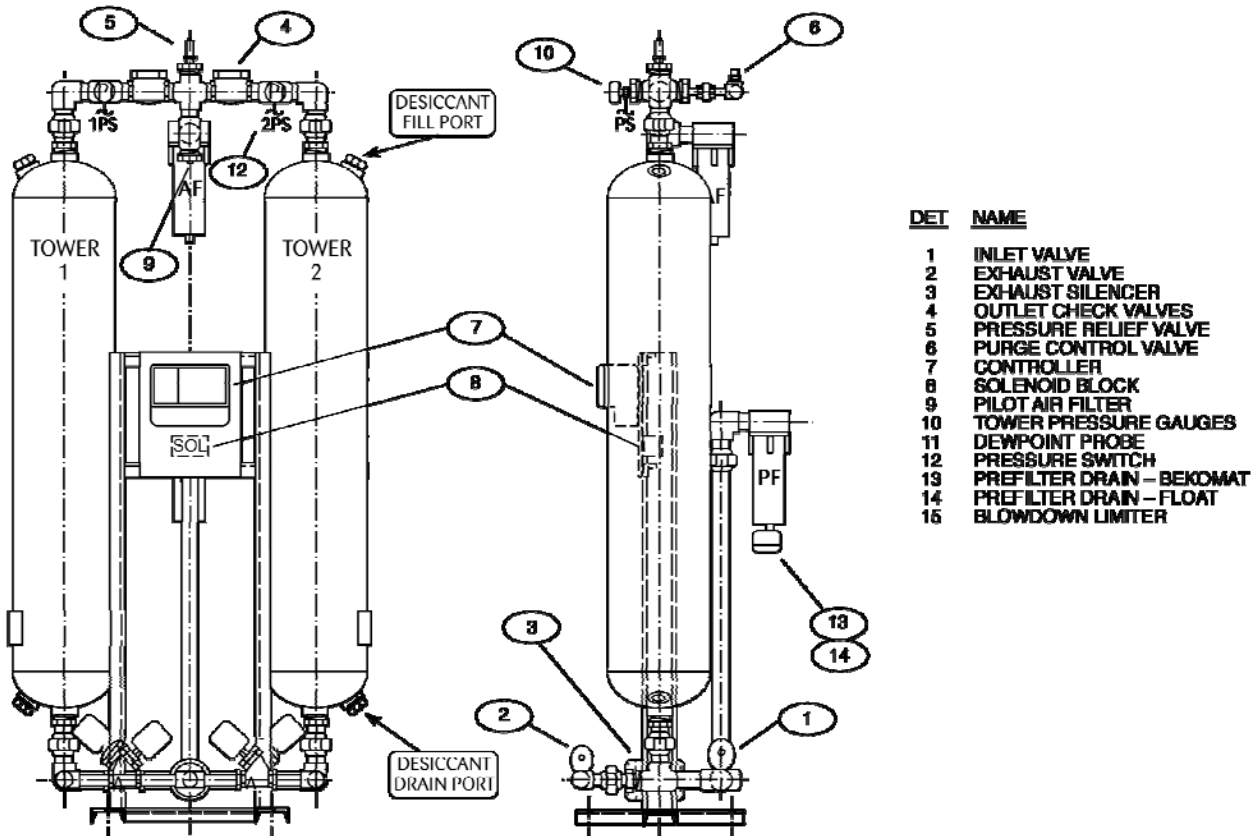
The suggested stocking the suggested spare parts to help enable you to promptly change any defected parts without having to wait for the parts to be delivered. If you need to replace any other parts, please contact the local supporting distributor or BEKO Technologies Corporation Technical Help Desk @ 1-800-235-6797.

ID.	SPARE PART DESCRIPTION	CODE	80	120	160	220	320	440	580	740	900	1300	1600	2050	2980	4000	5100
1	¾" Inlet Angle Body Valve	4020801	2														
	¾" Inlet Valve Service Kit	4020841	2♦														
	1" Inlet Angle Body Valve	4020803		2	2												
	1" Inlet Valve Service Kit	4020850		2♦	2♦												
	1½" Inlet Angle Body Valve	4020805				2	2	2									
	1½" Inlet Valve Service Kit	4020852				2♦	2♦	2♦									
	2" Inlet Angle Body Valve	4020807							2	2							
	2" Inlet Valve Service Kit	4020854							2♦	2♦							
	2½" Inlet Angle Body Valve	4020809									2						
	2½" Inlet Valve Service Kit	4020856									2♦						
	3" Inlet Butterfly Valve	4020812										2♦	2♦				
4" Inlet Butterfly Valve	4020813												2♦	2♦			
6" Inlet Butterfly Valve	4020814														2♦	2♦	
2	¾" Purge Angle Body Valve	4020800	2														
	¾" Purge Valve Service Kit	4020840	2♦														
	1" Purge Angle Body Valve	4020802		2	2	2	2	2									
	1" Purge Valve Service Kit	4020842		2♦	2♦	2♦	2♦	2♦									
	1½" Purge Angle Body Valve	4020804							2	2							
	1½" Purge Valve Service Kit	4020851							2♦	2♦							
	2" Purge Angle Body Valve	4020806									2						
	2" Purge Valve Service Kit	4020853									2♦						
	2½" Purge Angle Body Valve	4020808										2					
	2½" Purge Valve Service Kit	4020855										2♦					
	3" Purge Butterfly Valve	4020812											2♦	2♦			
4" Purge Butterfly Valve	4020813													2♦			
6" Purge Butterfly Valve	4020814														2♦	2♦	
3	¾" Exhaust Silencer	4020833	1♦														
	1" Exhaust Silencer	4020834		1♦	1♦	1♦	1♦	1♦									
	1½" Exhaust Silencer	4020835							1♦	1♦							
	2" Exhaust Silencer	4020836									1♦	2♦					
	3" Exhaust Silencer	4020837											2♦	2♦			
	4" Exhaust Silencer	4020838													2♦		
	6" Exhaust Silencer	4020839														2♦	2♦
4	¾" Check Valve	4020820	2														
	1" Check Valve	4020822		2	2												
	1½" Check Valve	4020821				2	2	2									
	2" Check Valve	4020823							2	2							
	2½" Check Valve	4020816									2						
	3" Check Valve	4020817										2	2				
	4" Check Valve	4020818												2	2		
	6" Check Valve	4020819														2	2
5	¼" Pressure Relief Valve	4020830	♦	♦	♦	♦	♦	♦	♦	♦							
	½" Pressure Relief Valve	4020831									♦	♦	♦	♦	♦	♦	♦
-	Desiccant (Lbs per Dryer)	4010331	100	140	180	250	360	490	640	800	1000	1400	1800	2400	3300	4500	5600
6	¼" Purge Control Valve	4020745	1														
	½" Purge Control Valve	4020764		1	1												
	¾" Purge Control Valve	4020765				1											
	1" Purge Control Valve	4020766					1	1									
	1½" Purge Control Valve	4020767							1	1							
	2" Purge Control Valve	4021199									1						
7	Electronic Controller	4020348	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
8	Solenoid Valve (Complete)	4020827	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
9	Pilot Air Filter	4020826	1	1	1	1	1	1	1	1	1						
		4020825										1	1	1	1	1	1
10	Tower Pressure Gauges	4020828	2	2	2	2	2	2	2	2							
		4020829									2	2	2	2	2	2	2
11	Dewpoint Probe(Optional)	4014062	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
12	Pressure Switch (Cycle Failure)	4020832	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

ID.	SPARE PART DESCRIPTION	CODE	80	120	160	220	320	440	580	740	900	1300	1600	2050	2980	4000	5100	
-	Replacement Pre-Filter Element	07S	◆	◆														
		10S			◆													
		15S				◆												
		18S					◆											
		20S						◆										
		22S							◆									
		23S								◆								
		25S									◆							
		27S										◆						
		32S											◆					
	88S												◆	3◆	4◆	◆7	◆7	
13	Inlet Filter Drain Complete (BEKOMAT Zero Air Loss)	4009550	◆	◆	◆	◆	◆	◆	◆	◆	◆							
-	BEKOMAT 31 Service Kit	4015909	◆	◆	◆	◆	◆	◆	◆	◆	◆							
13	Inlet Filter Drain Complete (BEKOMAT Zero Air Loss)	4009901										◆	◆	◆	◆	◆	◆	
-	BEKOMAT 32 Service Kit	4015910										◆	◆	◆	◆	◆	◆	
14	Inlet Filter Drain Complete (Float Type)	4015531	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
-	Replacement Post-filter Element	07F	◆	◆														
		10F			◆													
		15F				◆												
		18F					◆											
		20F						◆										
		22F							◆									
		23F								◆								
		25F									◆							
		27F										◆						
		32F											◆					
	88F											◆	3◆	4◆	◆7	◆7		

◆ Recommended spare parts.

NOTE : To order the recommended spare parts or any other part always indicate the data on the identification plate.



6.4 DISMANTLING OF THE DRYER

If the dryer is to be dismantled, it has to be split into Material groups of materials.



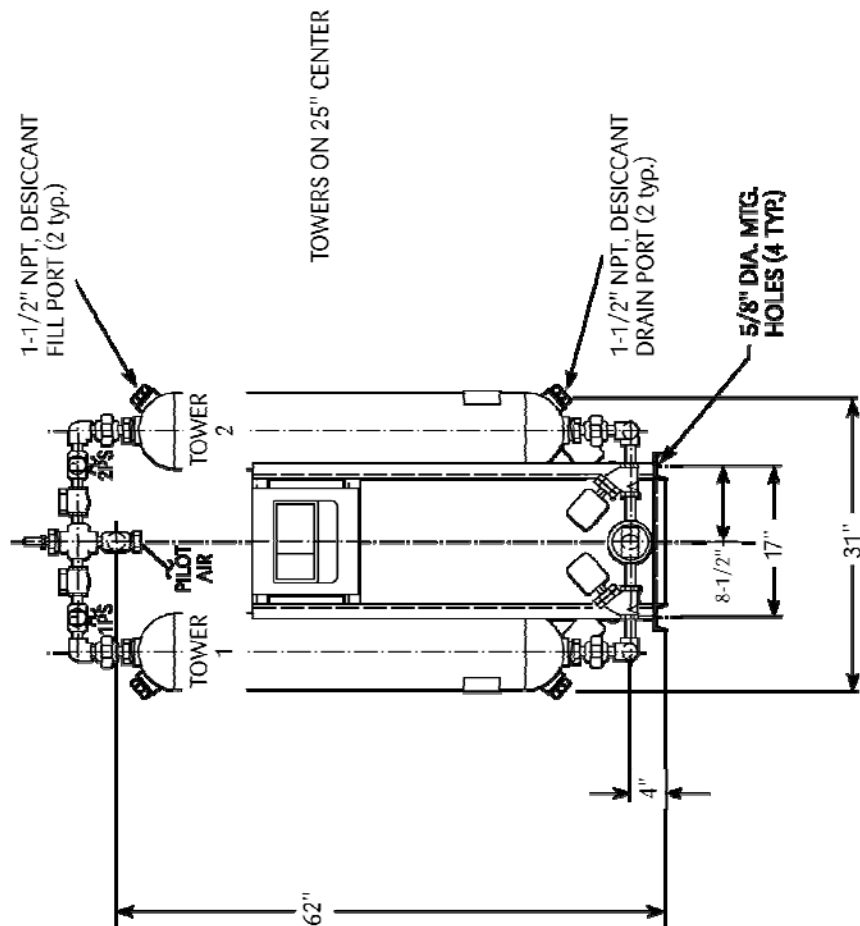
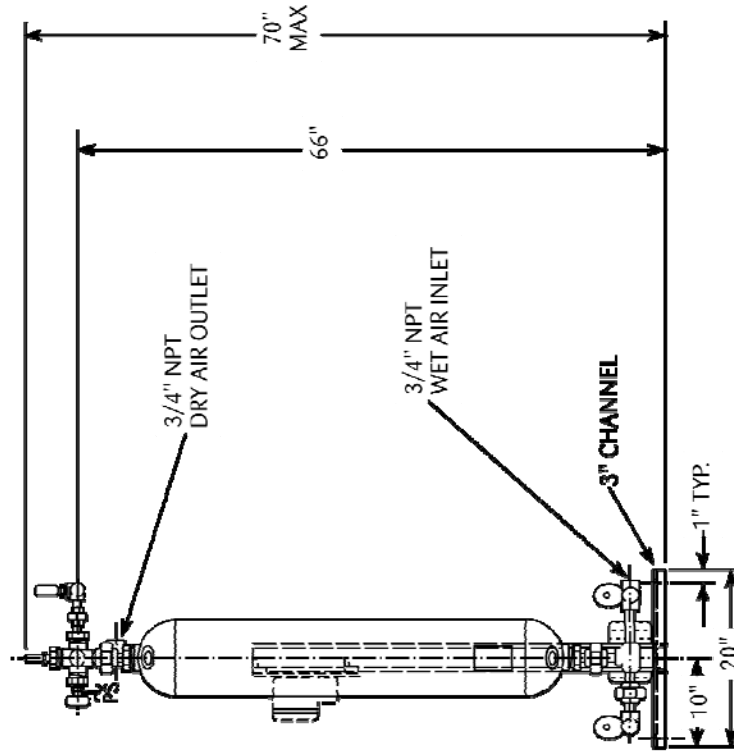
Part	Material
Desiccant material	Activated Alumina Oil
Frame and supports	Carbon steel, Epoxy paint
Piping	Aluminum, Carbon steel, Epoxy paint
Towers and diffuser	Carbon steel, Stainless steel, Epoxy paint
Valves	Brass/SS
Filter housing	Aluminum, Epoxy paint
Filter cartridge	Filtering material, PVC, Oil
Solenoid valve	Bronze, Steel, Techno-polymer, PVC
Condensate Drain	PVC, Aluminum, Steel, Bronze
Silencers	Aluminum, Stainless Steel
Safety Valves	Brass
Gaskets and O-Ring	Graphite, synthetic elastomer
Electric cables	Copper, PVC
Electric Parts	PVC, Copper, Bronze



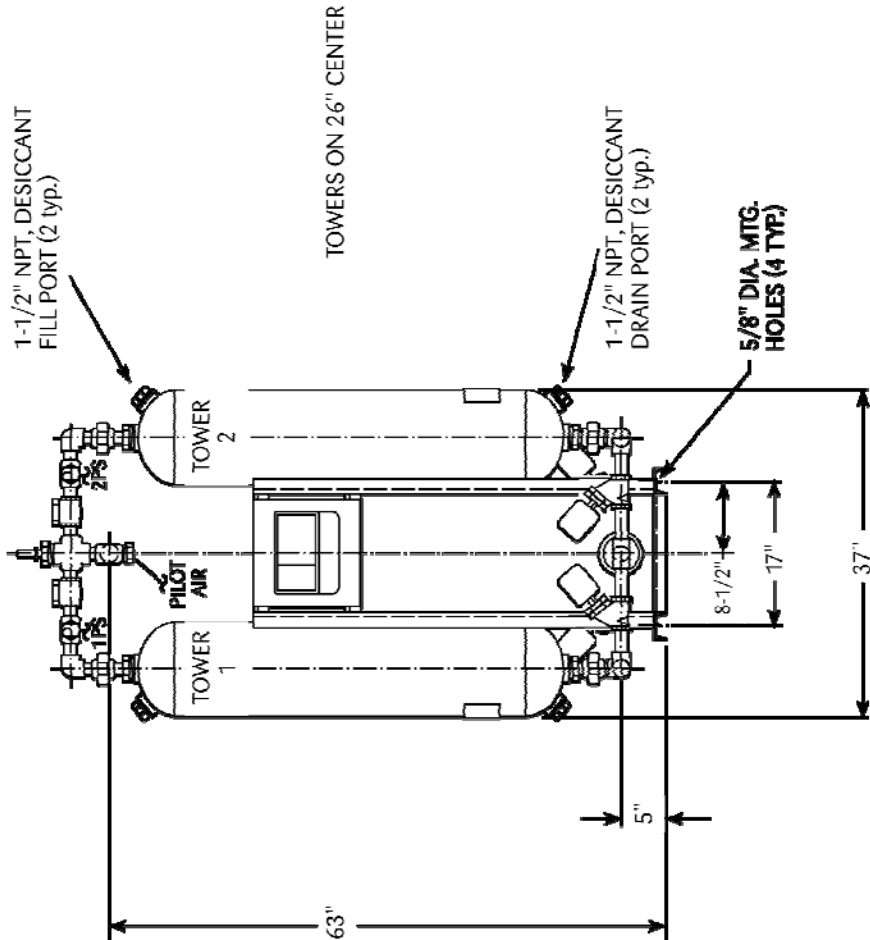
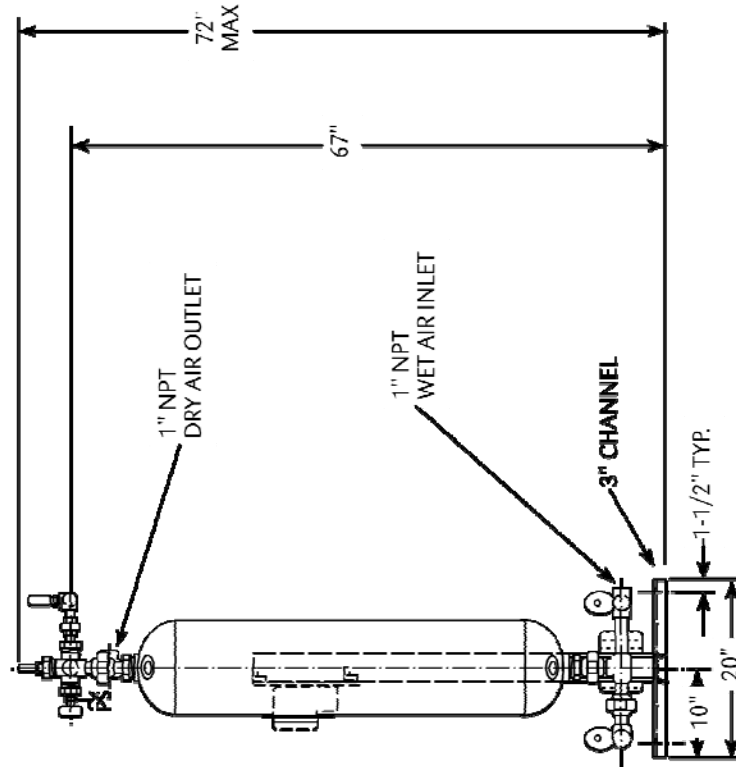
We recommend complying with the safety rules and regulations for the disposal of each type of material. The adsorption material and the filter cartridge contains droplets of lubrication oil. Do not dispose these materials in the environment. All local Governmental laws and regulations must be followed in disposing of the materials.

7.1 DRYER DIMENSIONS

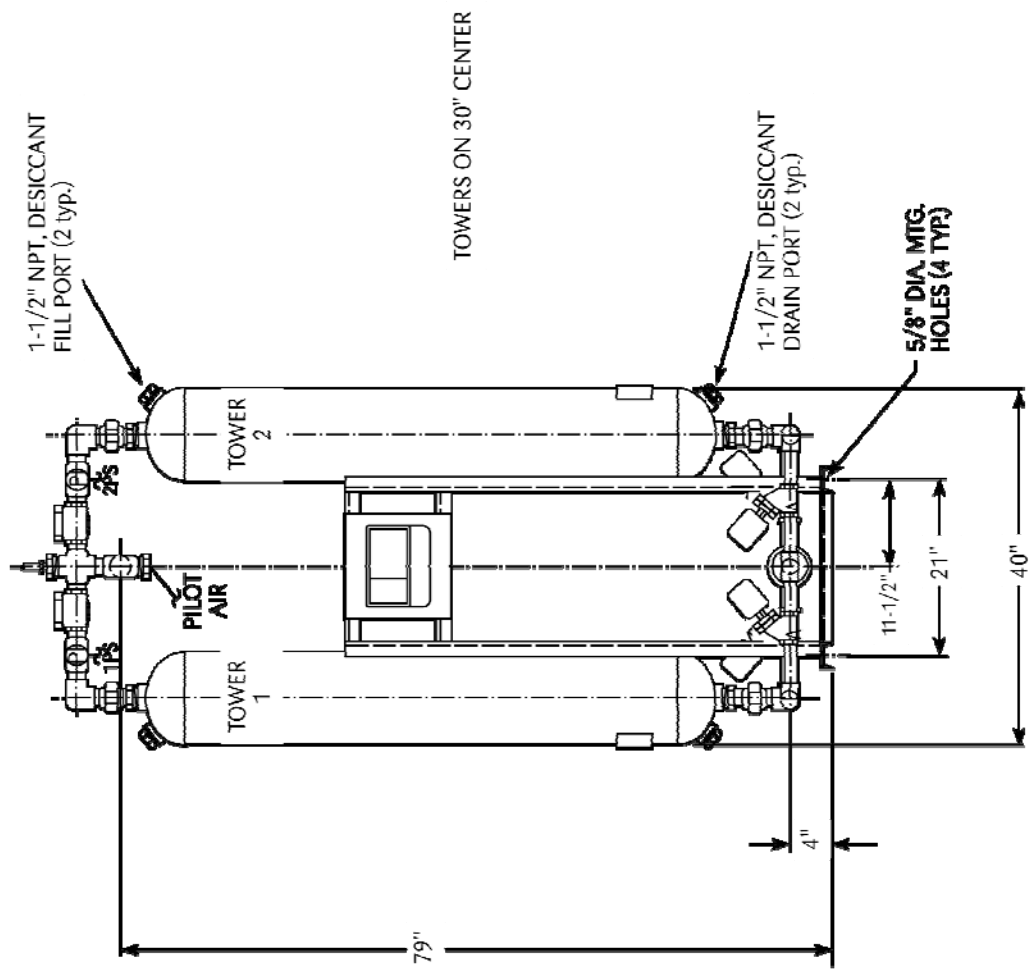
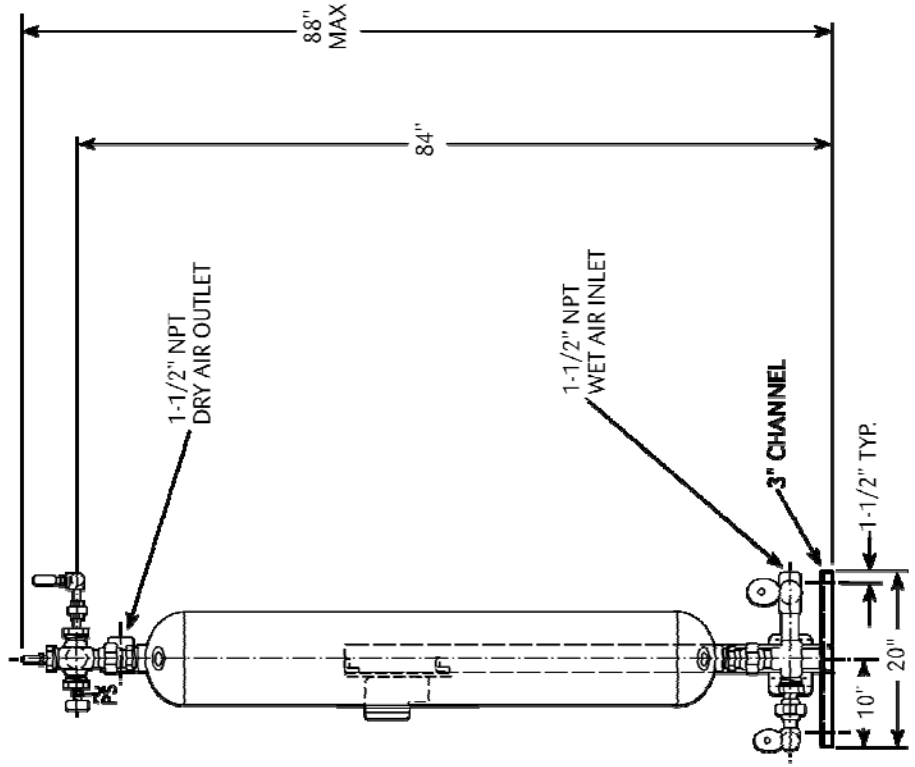
7.1.1 ACF80 Dryer Dimensions



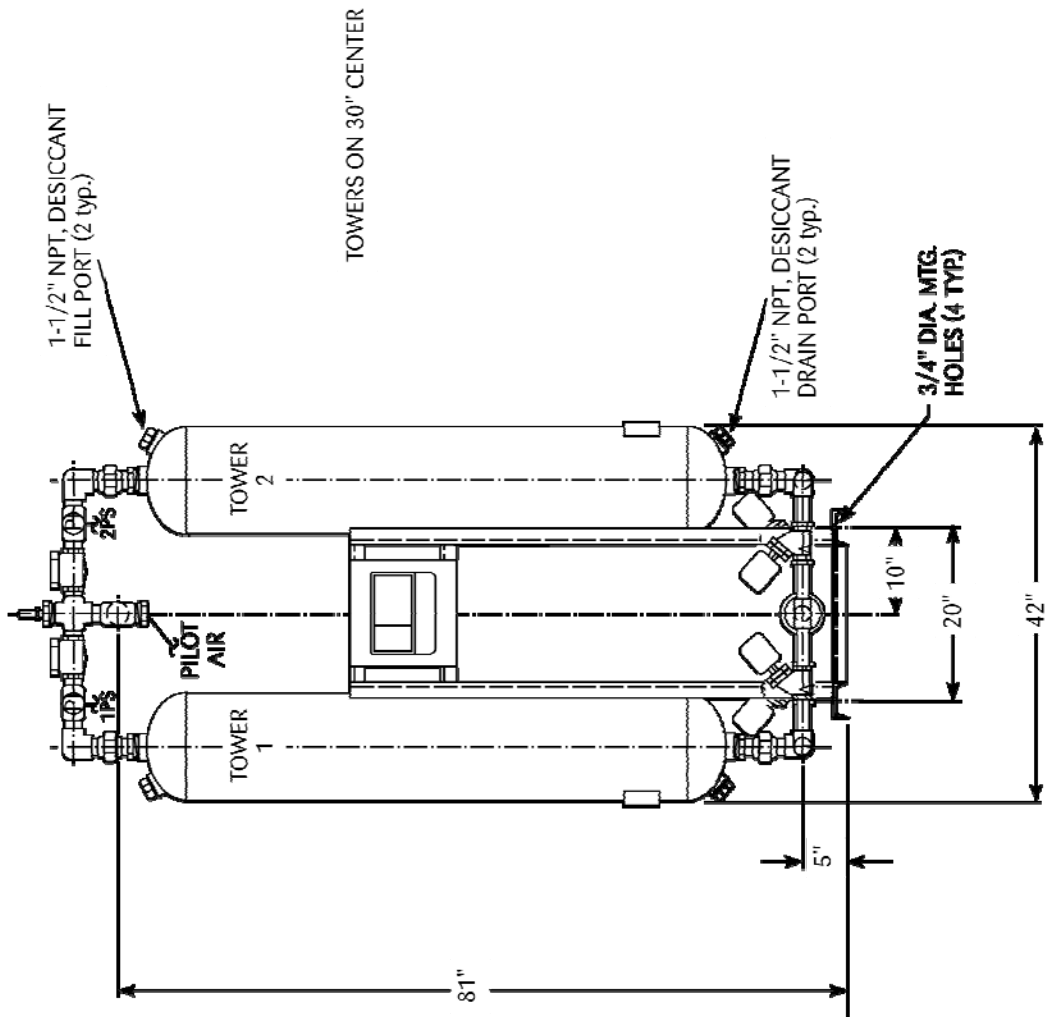
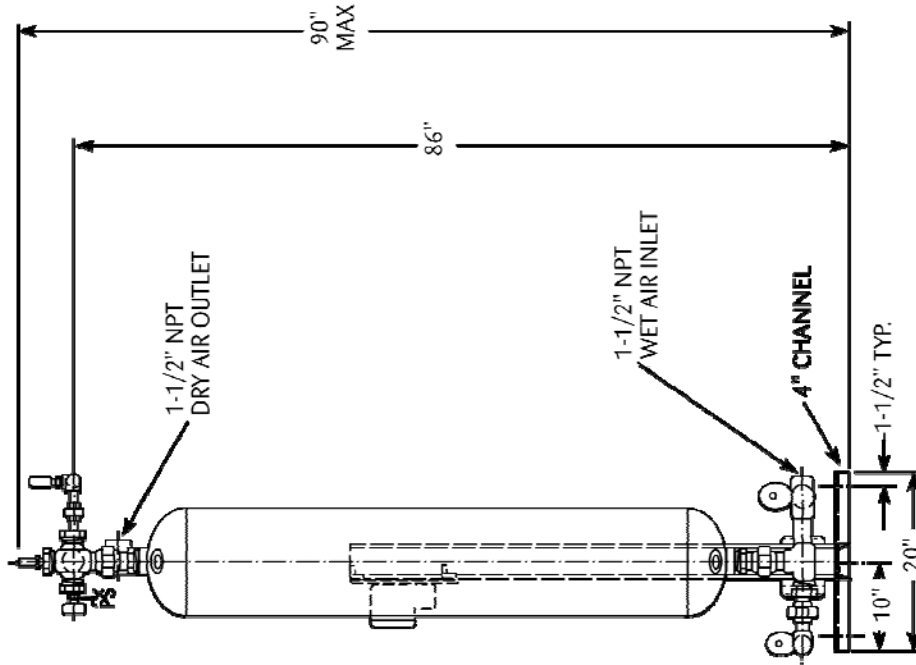
7.1.2 ACF120/160 Dryer Dimensions



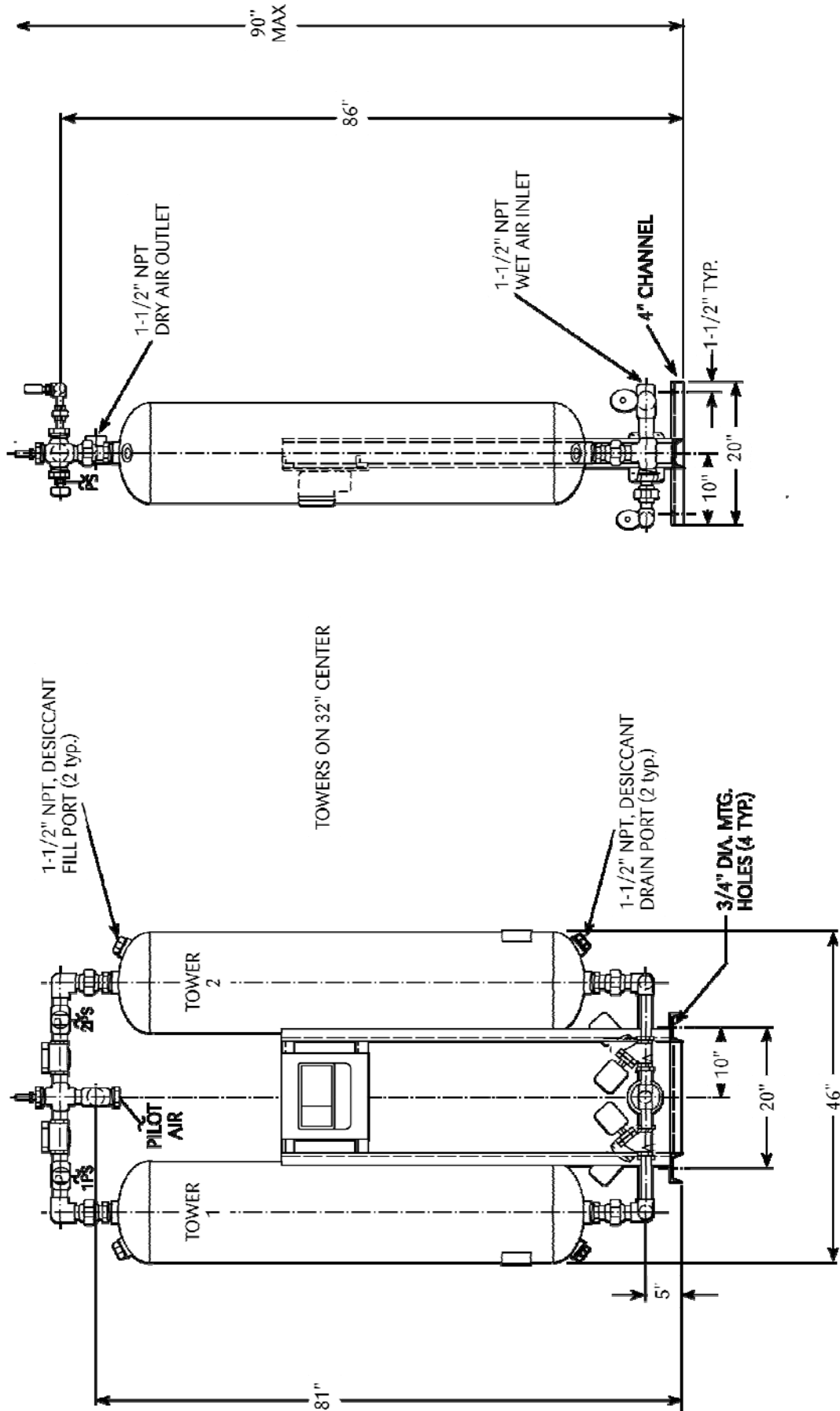
7.1.3 ACF220 Dryer Dimensions



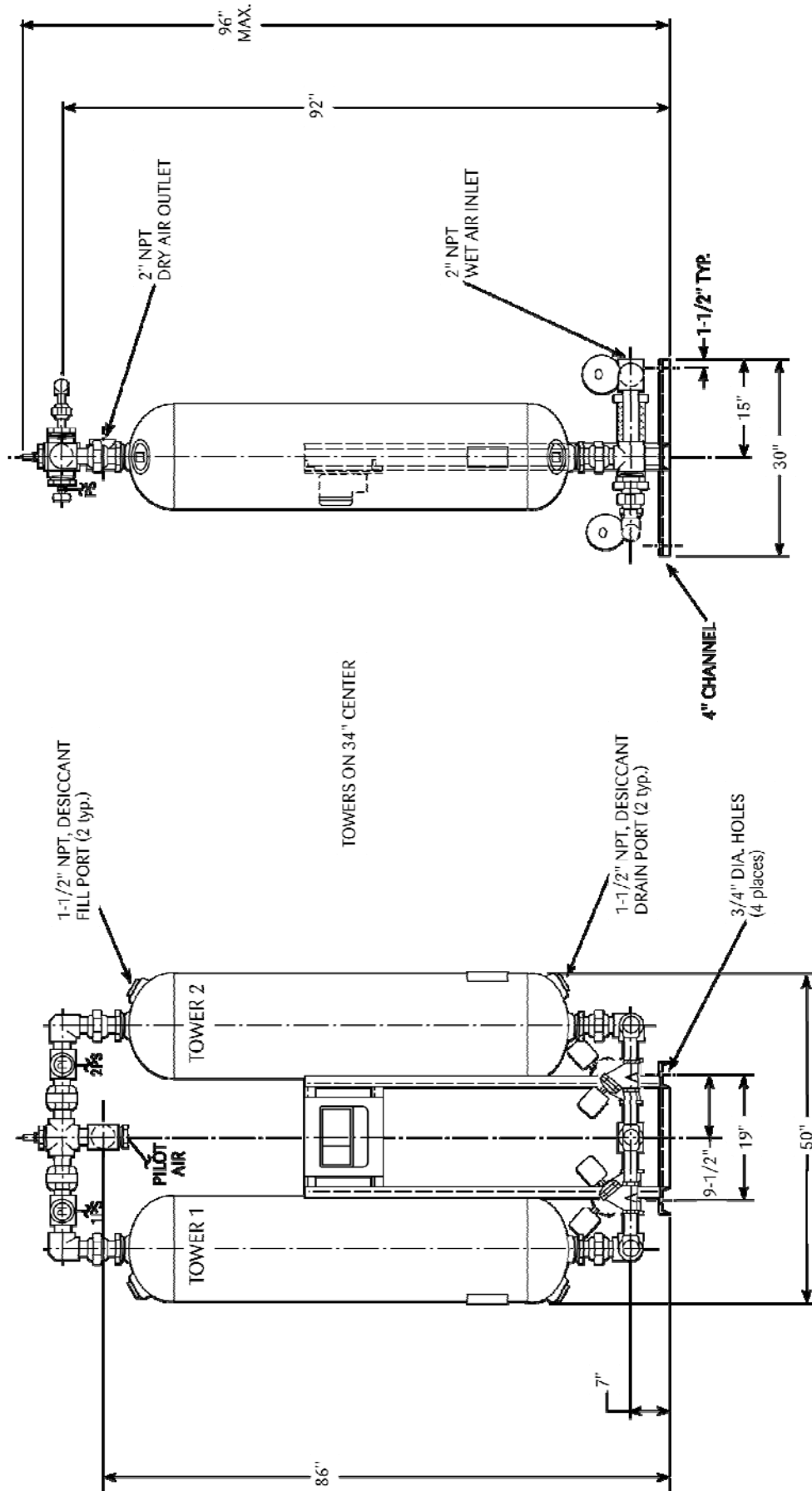
7.1.4 ACF320 Dryer Dimensions



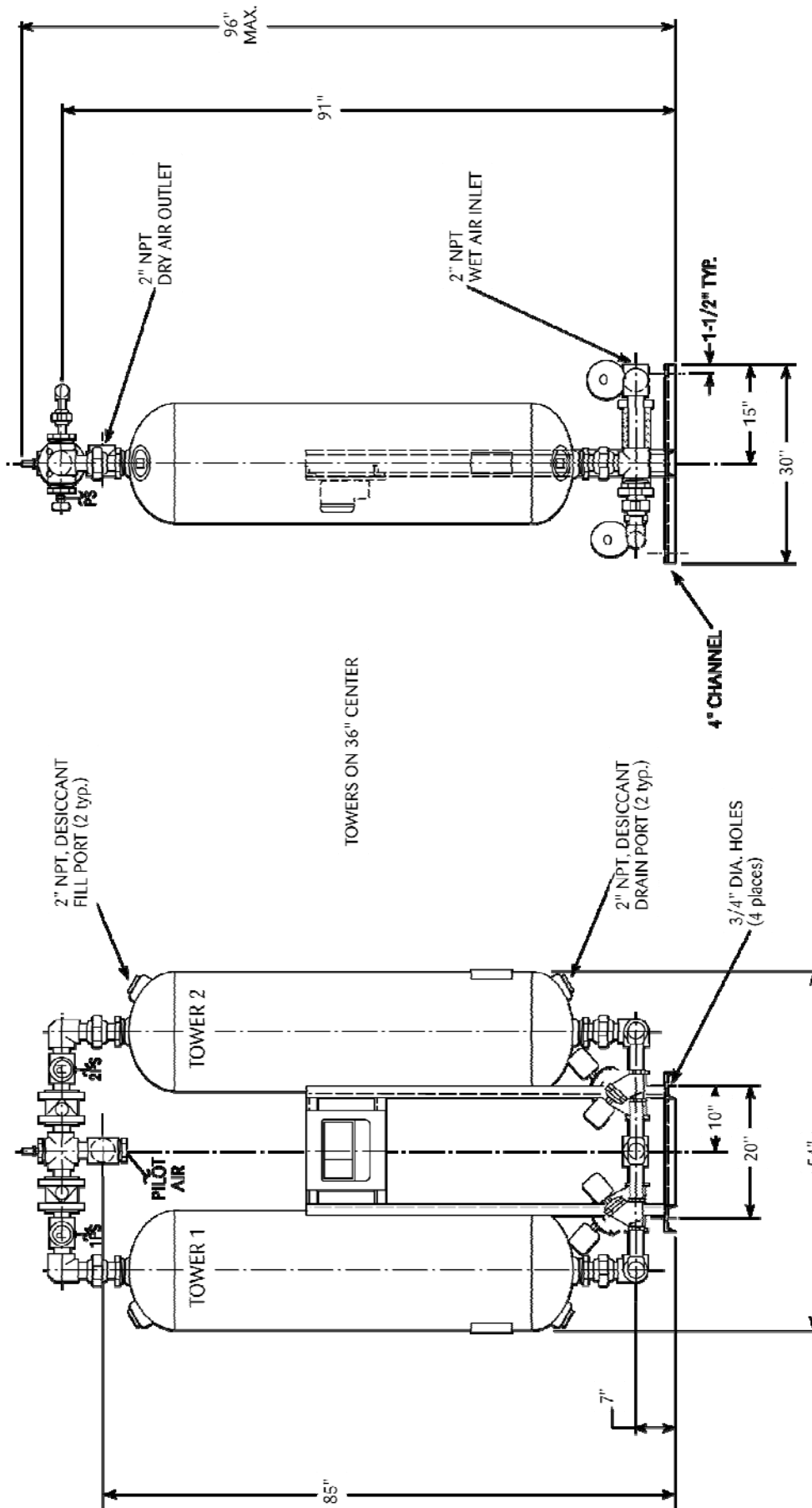
7.1.5 ACF440 Dryer Dimensions



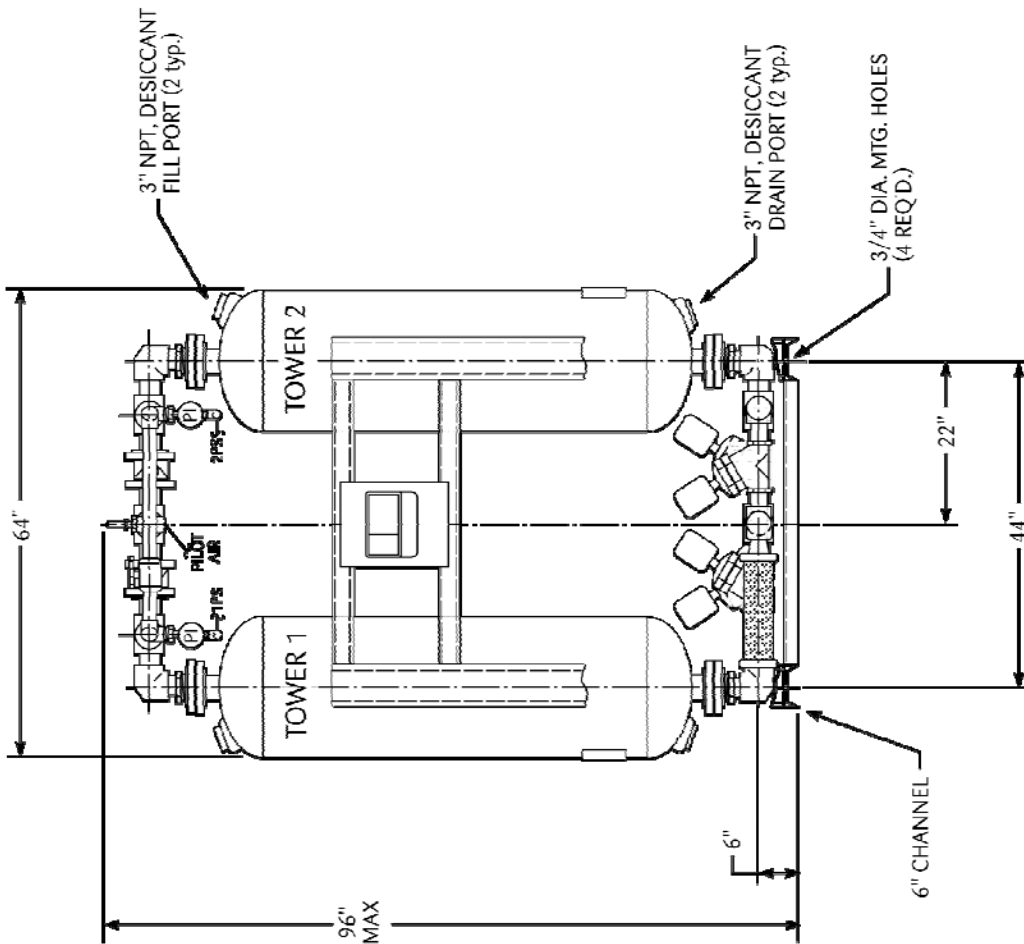
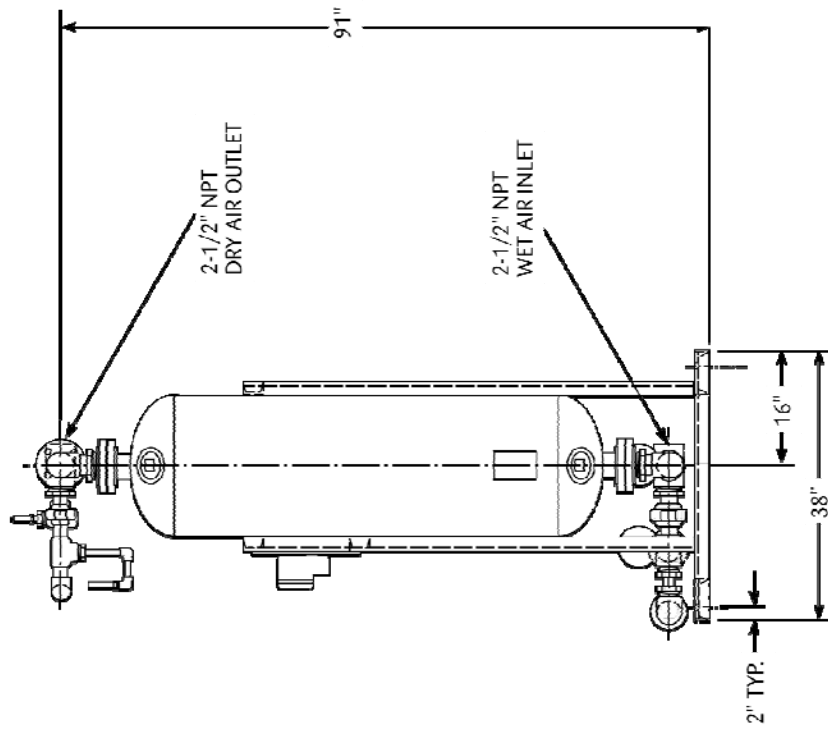
7.1.6 ACF580 Dryer Dimensions



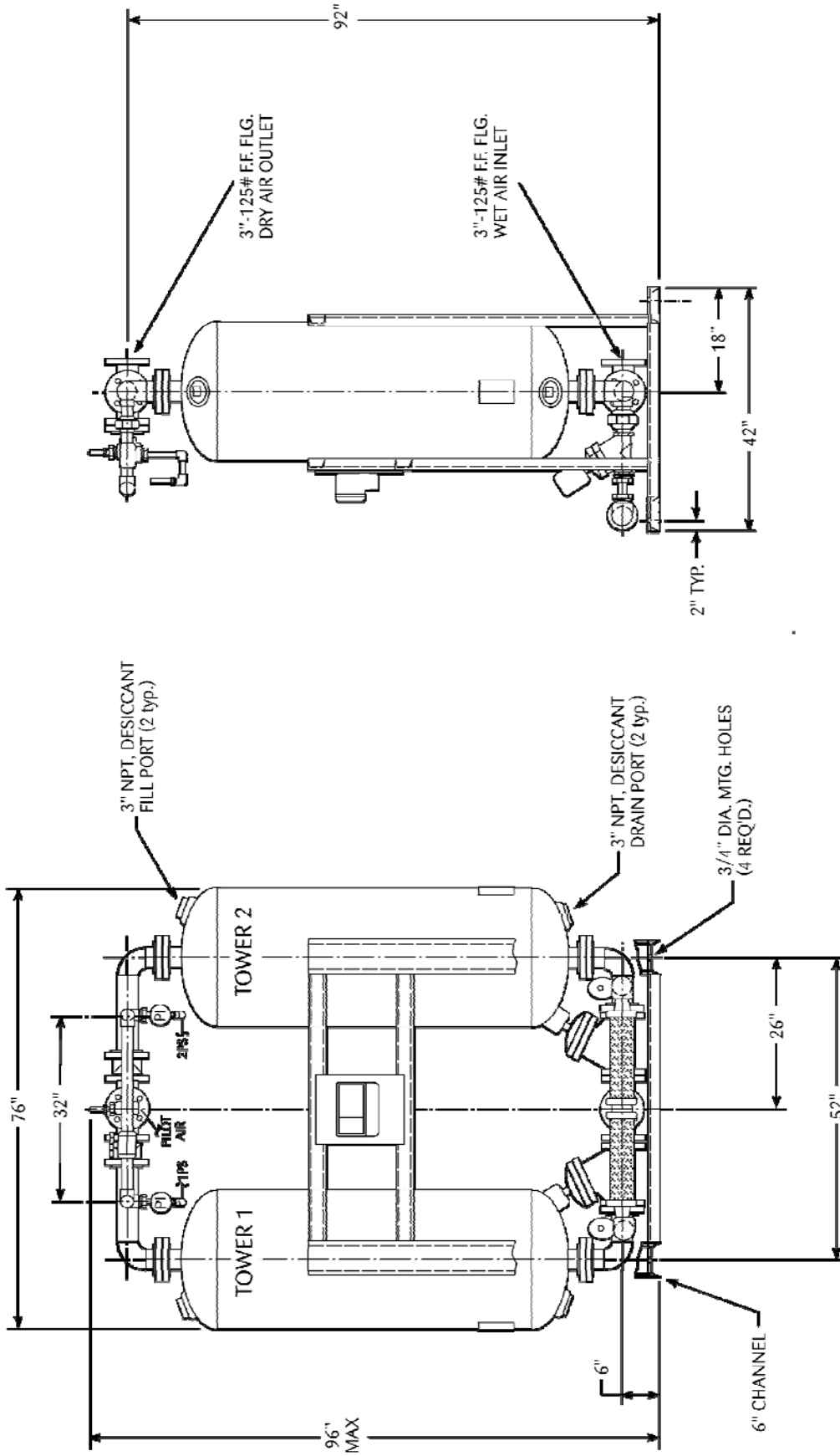
7.1.7 ACF740 Dryer Dimensions



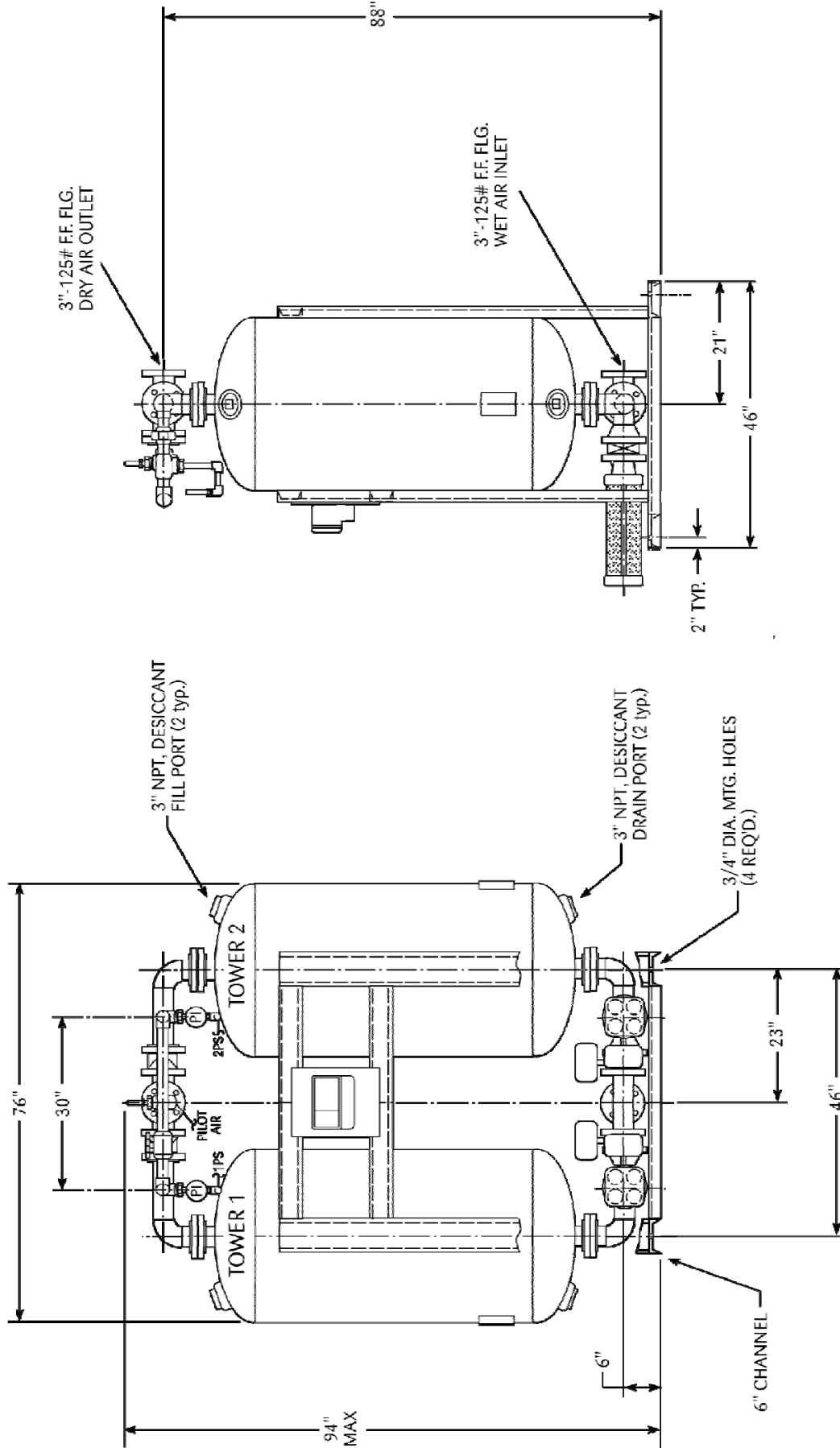
7.1.8 ACF900 Dryer Dimensions



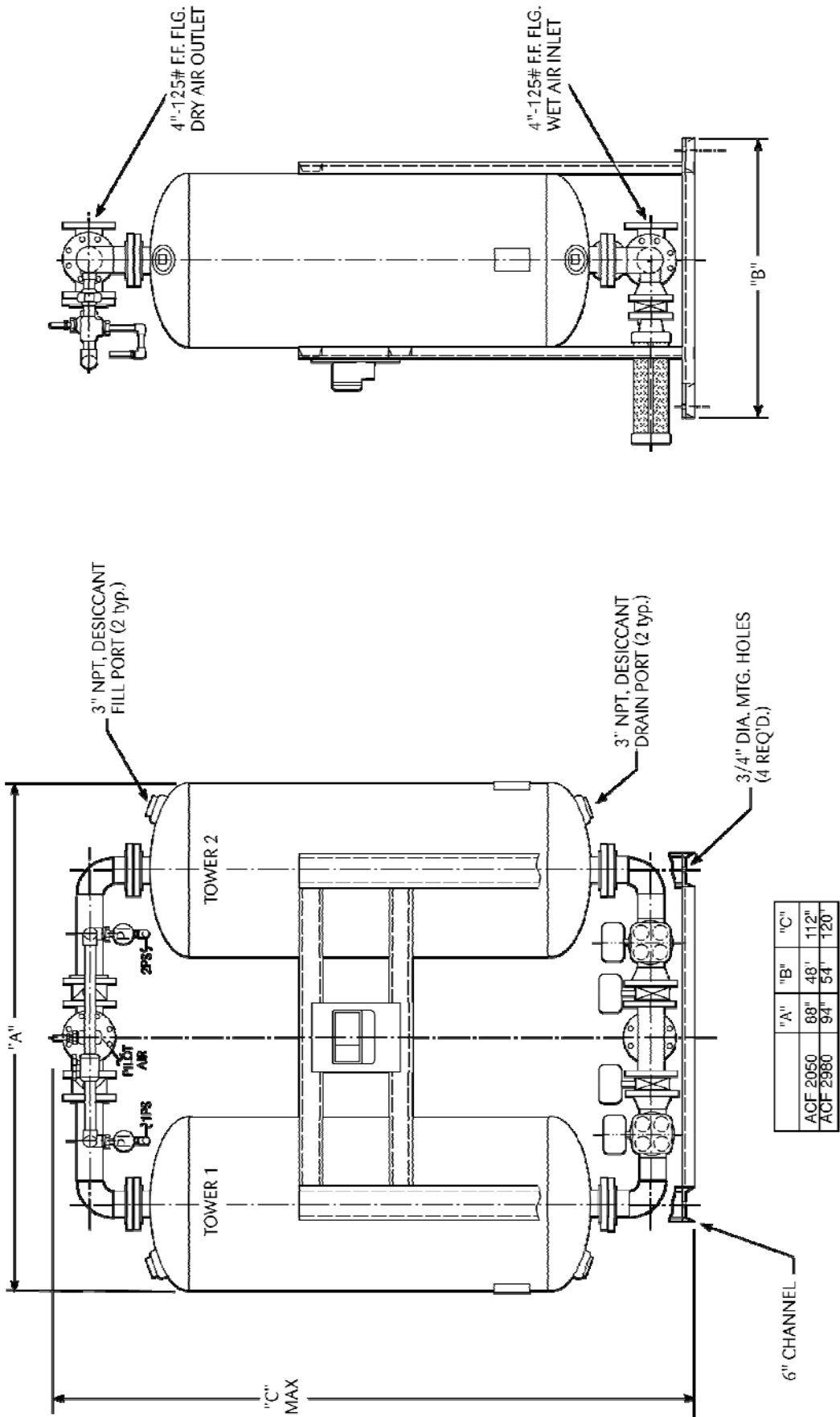
7.1.9 ACF1300 Dryer Dimensions



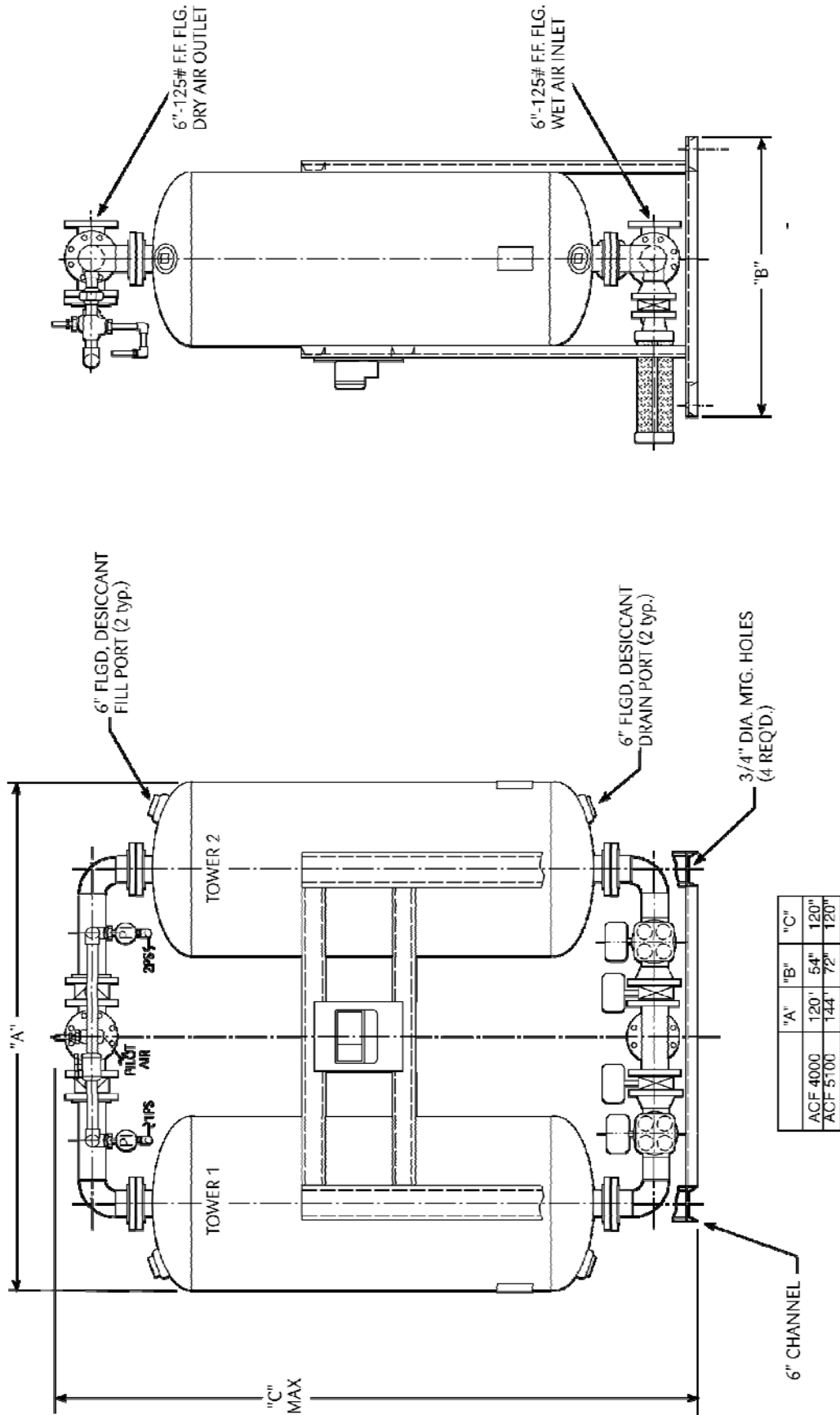
7.1.10 ACF1600 Dryer Dimensions



7.1.11 ACF2050 – 2980 Dryer Dimensions

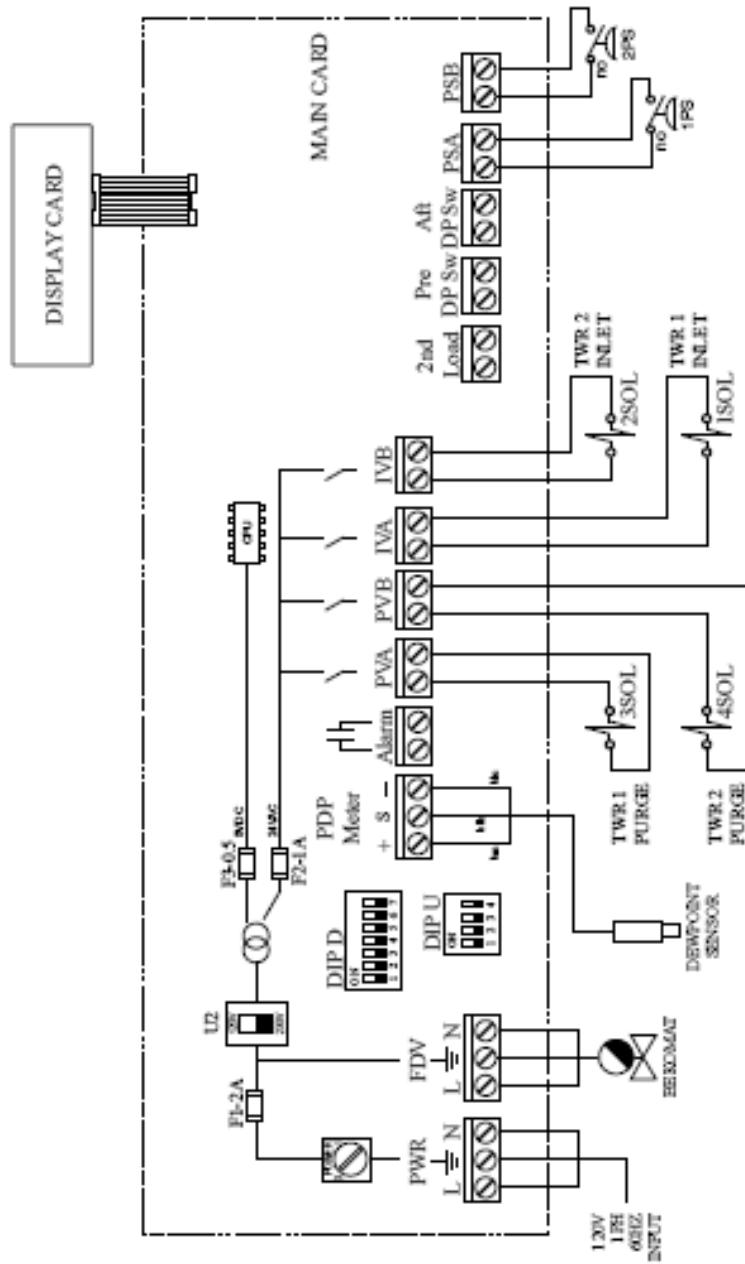


7.1.12 ACF4000 – 5100 Dryer Dimensions



7.2 WIRING

7.2.1 Electrical Wiring ACF 80 – 5100



7.3.2 *Wiring components chart – dryer ACF 80-5100*

Shift Manager : Electronic Controller
Main Card : Main board
Display Card : Display module of electronic board
PWR : Supply power
FDV : Inlet filter drain
FT IN : Inlet filter pressure switch
FT OUT : Outlet filter pressure switch
PSA : Tower A pressure switch
PSB : Tower B pressure switch
2nd Load : Engagement Second load
PDP Meter : DewPoint meter
ALARM : Clean contact for alarm control
PVA : Tower A regeneration valve
PVB : Tower B regeneration valve
IVA : Tower A inlet valve
IVB : Tower B inlet valve
DIPS U : Dip-Switch series U
DIPS D : Dip-Switch series D

BN : BROWN

BU : BLUE

BK : BLACK

NOTES

Compressed air treatment and condensate technology.

The complete program. Worldwide.



BEKO Technologies Corp.

900 Great Southwest Parkway
Atlanta, GA 30336
USA

www.bekousa.com

+1 (800) 235-6797

+1 (404) 629-6666

beko@bekousa.com



US Edition, Revision: 01-February 2012

Subject to technical changes without prior notice; the information provided does not represent characteristics of state within the meaning of the German Civil Code (BGB).
© Registered Trademarks by BEKO TECHNOLOGIES GmbH, Neuss, Germany and BEKO TECHNOLOGIES CORP, Atlanta, GA USA.