

**Series D Solutions**

**[LSN2.com](http://LSN2.com)**

### Series D

Series D membrane air dryers were developed to accommodate customers who need source of clean, dry point of use of air (CDA).

Dirt, water vapor and other impurities enter the air compressor with the atmospheric air. During the compression process, oil (liquid and vapor) is commonly introduced. If not removed, these contaminants may cause costly production problems such as contamination of equipment, accelerated tool wear and product rejection.

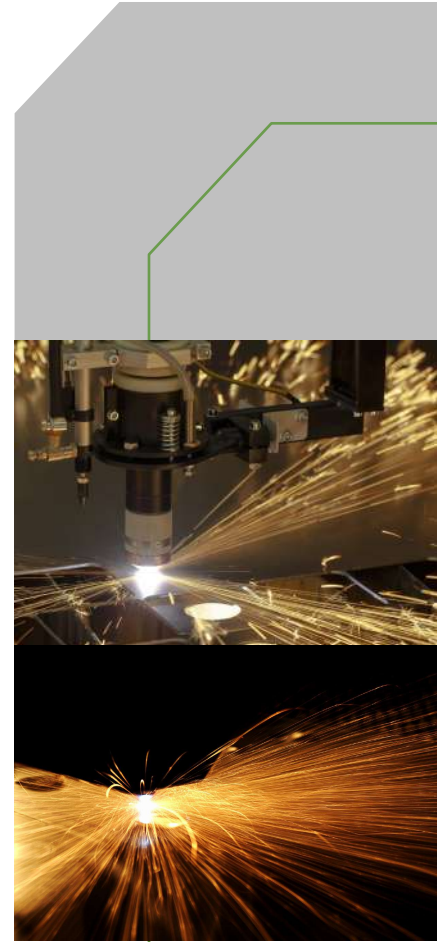
Ambient air temperature, quality and humidity will directly affect the effectiveness of air treatment equipment. Your application and environment will determine what level of air quality you need. Higher quality air can cost more to produce, more frequent maintenance and higher energy consumption. The economic advantages of reducing or eliminating moisture build a strong case for installing a Series D air dryer.

Series D air dehydration systems are environmentally sound and eliminate the need for desiccant replacements. Flow rates are available between 6 and 100 scfm at pressure dew points of -40°F and below. Complete systems including the compressor are also available.

### Dry Air Assist

We offer dry air assist systems. These systems should not be confused with shop air cutting. Shop air cutting works for thinner gauge material. We offer flow rates of up to 150 scfm and pressure dew points of -40°F at 400 psig. Cutting with compressed air may yield the same weld and paint friendly surface as cutting with nitrogen, often at increased cutting feed rates.

To process the upper ranges of Stainless Steel and Aluminum, you will need a compressor capable outputting elevated pressures, in other words the 125 psig shop compressor just won't cut it (no pun intended). Because the pressure requirements are typically higher than the standard shop compressors and require a dedicated system for cutting. We couple our Series D units with a rotary screw air compressor and provide delivery pressures up to 14 barg (204 psig) for thinner gauge material and up to 30 barg (435 psig) for the thicker ranges when a booster compressor is included.



Series D5 / D7					
	Flow scfm (scfh)	Max Pressure barg (psig)	Air Comp (kW)	Booster (kW)	Dims (L x W x H)
<b>D5-F30</b>	30 (1800)	14 (204)	30	NA	10' x 4' x 5'
<b>D5-F50</b>	50 (3000)	14 (204)	40	NA	10' x 4' x 5'
<b>D7-F50</b>	50 (3000)	30 (435)	15	15	11' x 8' x 8'
<b>D7-F75</b>	75 (4500)	30 (435)	18	15	11' x 8' x 8'
<b>D7-F100</b>	100 (6000)	30 (435)	22	15	11' x 8' x 8'
<b>D7-F150</b>	150 (9000)		30	22	12 x 8' x 8'
<b>*Larger Systems Available Upon Request</b>					

### Typical Fast Cut Speeds (ipm)

Material Thickness	Aluminum	Stainless Steel	Mild Steel	Galvanized
<b>0.040</b>	1400-1600	1400-1600	1100-1250	1400-1600
<b>0.060</b>	1100-1200	1100-1200	800-1000	800-1000
<b>0.080</b>	900-1000	700-900	700-900	700-850
<b>0.120</b>	700-800	350-450	350-450	
<b>0.180</b>	400-450	150-200	150-200	
<b>0.250</b>	125-150	100-130		

**Plasma Cutting**

Plasma may be the meanest method of cutting, but sometimes the biggest dude on the block has a glass jaw. Plasma cutting's kryptonite is water. Obviously, you would think twice before using anything electronic around water, but what we are talking about is water / moisture in the compressed air.

Most facilities employ a standard air compressor to generate the air needed in the plasma cutting operation. When water enters the high temperatures (as much as 20,000 degrees F.) in the plenum of the torch, they immediately break down into oxygen and hydrogen, which alters the normal chemical content of air in the torch. These elements dramatically change the plasma arc which causes the torch consumables parts to wear very quickly, altering the shape of the nozzle orifice and dramatically affecting cut quality in terms of edge square-ness, dross formation, and edge smoothness.

**Consumables on the Plasma**

Each time you need to replace your consumables your cutting equipment may be down for 15 minutes and you are out \$25.00 in parts. Implementing a Series D solution from Liberty Systems can save you as much as \$700.00 per month or \$8400.00 annually and have an ROI of less than 6 months.

Analysis		
	Typical Air System	Series D
Nozzles / Electrodes Per Day	2	1
Cost per Nozzle	\$25.00	\$25.00
Cost Per Electrode	\$10.00	\$10.00
Daily Expense	\$70.00	\$35.00
Monthly Expense	\$1400.00	\$700.00
<b>Annual Expense</b>	<b>\$16,800.00</b>	<b>\$8,400.00</b>

Membrane-type dryers are gas-separation devices. They consist of miniature membrane tubes made of plastic materials compounded to allow water vapor to pass through when there is a vapor pressure differential. They work as your lungs do, venting water vapor each time you exhale.

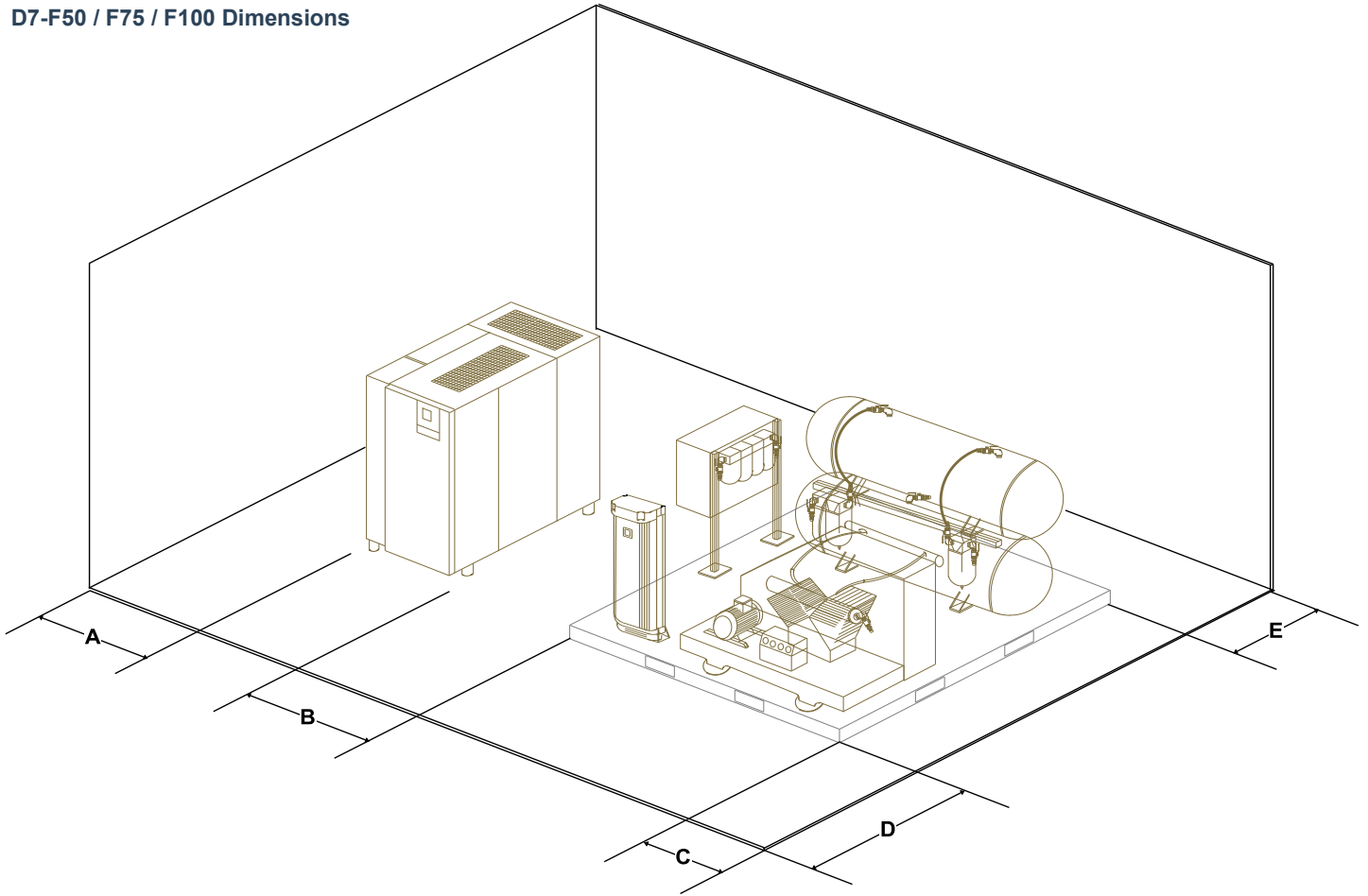
The inlet flow rate and pressure determine the outlet dew point suppression. In other words, membrane air dryers deliver a consistent level of drying protection that follows the rise or fall of the inlet dew point temperature. and can easily be sized to follow the ISA recommended 20° F pressure dew point suppression below ambient.

They make no noise. They are inherently vibration-resistant. Because they are static, inert devices, the membrane never needs service or adjustment and does not require monitoring devices. Made of aluminum, they do not rust or corrode and don't need painting. They have almost no pressurized volume, so most pressure code restrictions do not apply.

Series D						
Inlet Pressure (psig)	D6NU Flow scfm (Feed scfm)	D13NU Flow scfm (Feed scfm)	D18NU Flow scfm (Feed scfm)	D26NU Flow scfm (Feed scfm)	D33NU Flow scfm (Feed scfm)	D40NU Flow scfm (Feed scfm)
100	6 (8)	13 (16)	18 (22)	26 (32)	33 (42)	39 (48)
125	8 (11)	17 (22)	23 (30)	31 (38)	36 (44)	46 (56)
150	10 (13)	20 (25)	27 (34)	37 (44)	44 (54)	54 (68)
200	12 (16)	26 (23)	36 (44)	52 (64)	66 (84)	78 (96)
<b>Dims (ins) (L x W x H)</b>	30 x 6 x 36	48 x 6 x 36	48 x 6 x 36	48 x 6 x 36	48 x 6 x 36	48 x 6 x 36
<b>Weight (lbs)</b>	19	23	35	44	52	60
<b>Filter Kit</b>	FMKND070	FMKND070	FMKND070	FMKND070	FMKND070	FMKND175
<b>*Larger Systems Available Upon Request</b>						

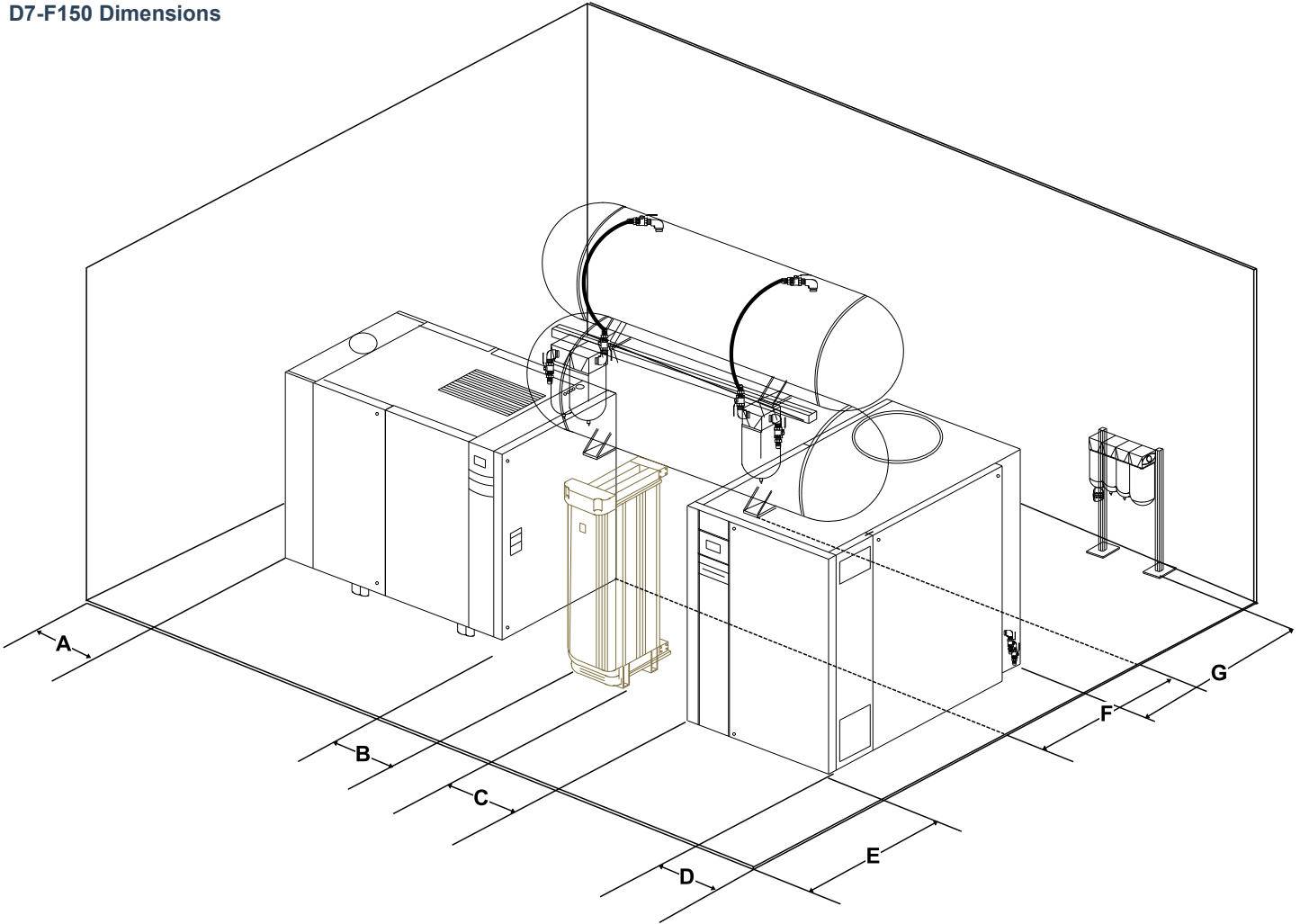
With minimum preventive maintenance, your membrane based air dryer is expected to have a life of more than 10 years.

**D7-F50 / F75 / F100 Dimensions**



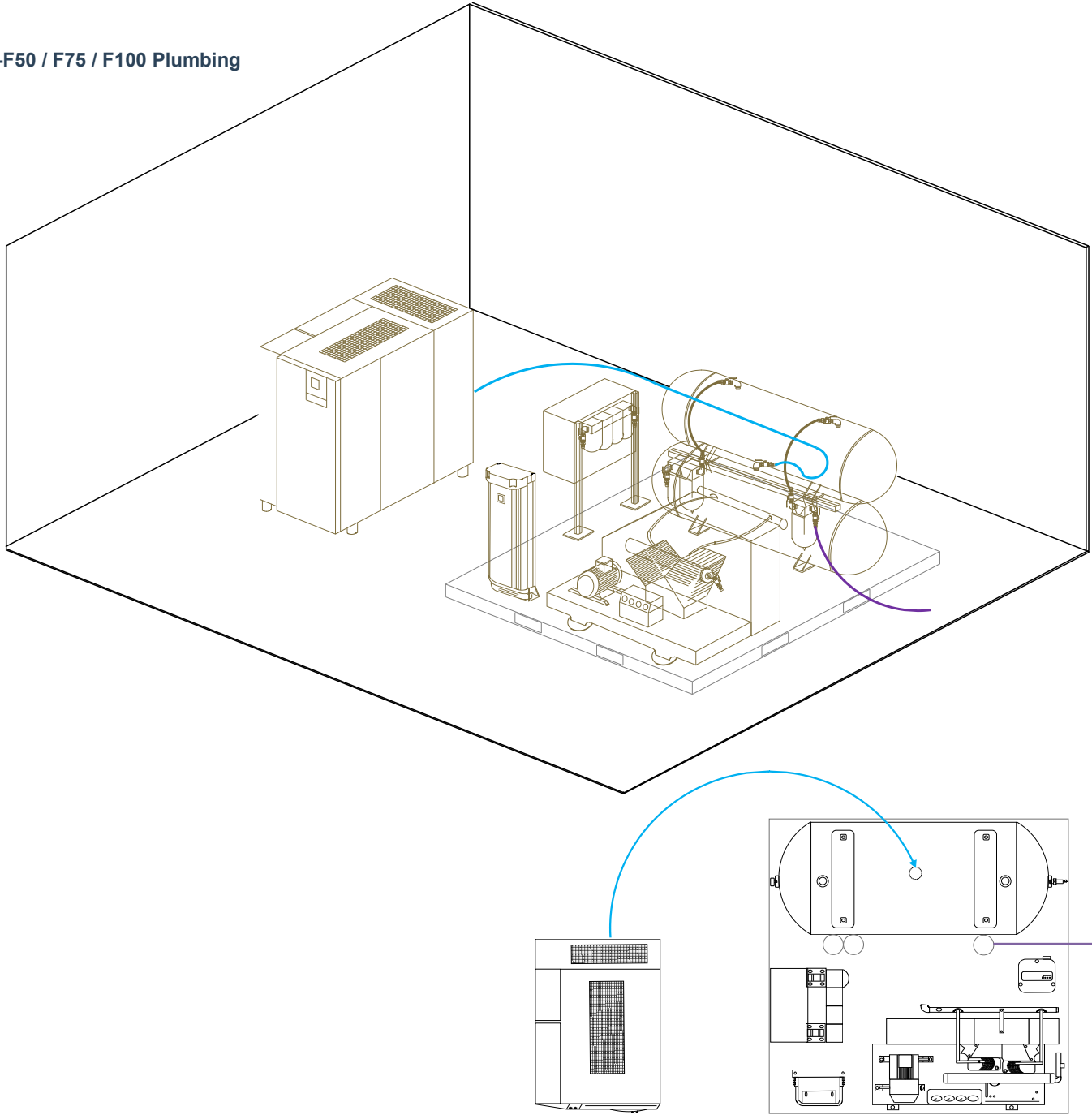
<b>D7-F50</b>				
	<b>W x D x H (inches)</b>	<b>Weight (LBS)</b>	<b>Inlet (inches)</b>	<b>Outlet (inches)</b>
<b>Air Compressor</b>	32 x 58 x 60.2	1,279	N/A	1 MJIC
<b>Booster Skid</b>	96 x 96 x 80	3,210	1 MJIC	1 FNPT
<b>D7-F75</b>				
<b>Air Compressor</b>	32 x 58 x 60.2	1,323	N/A	1 MJIC
<b>Booster Skid</b>	96 x 96 x 80	3,519	1 MJIC	1 FNPT
<b>D7-F100</b>				
<b>Air Compressor</b>	32 x 58 x 60.2	1,367	N/A	1 MJIC
<b>Booster Skid</b>	96 x 96 x 80	3,552	1 MJIC	1 FNPT
<b>Recommended Working Clearance (inches)</b>				
A=40	B=40	C=24	D=24	E=24



D7-F150 Dimensions



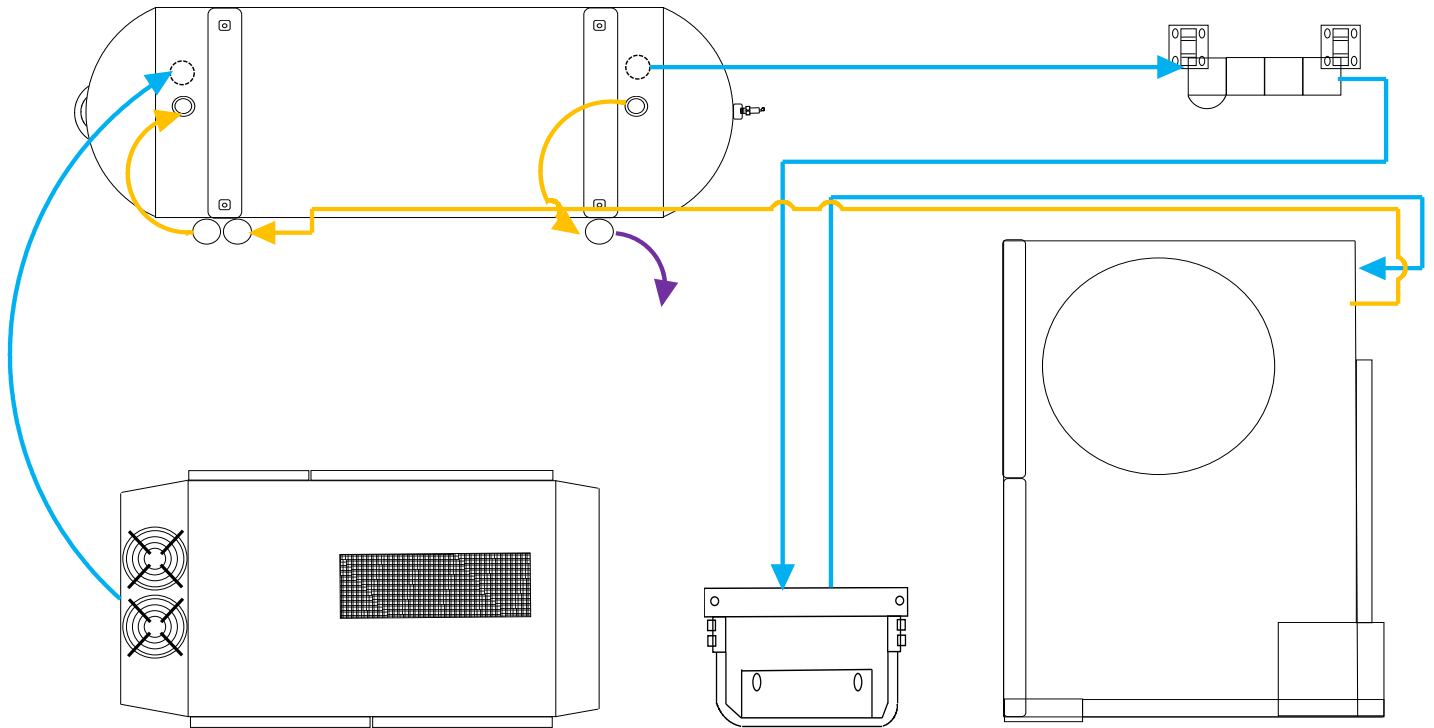
D7-F50				
	W x D x H (inches)	Weight (LBS)	Inlet (inches)	Outlet (inches)
Air Compressor	78 x 41 x 66.9	2,458	N/A	1 MJIC
Compressed Air Filters	30 x 13 x 40	65	1 MJIC	1 MJIC
Desiccant Air Dryer	16.8 x 11.1 x 72.8	247	1 MJIC	1 MJIC
Booster Skid	50.4 x 72 x 77.2	2,800	1 MJIC	1 MJIC
Compressed Air Tank / High Pressure Tank	117 x 50 x 107	4,700	1 MJIC	1 FNPT
Recommended Working Clearance (inches)				
A=40	B=40	C=24	D=24	E=24




D7-F50 / F75 / F100 Plumbing



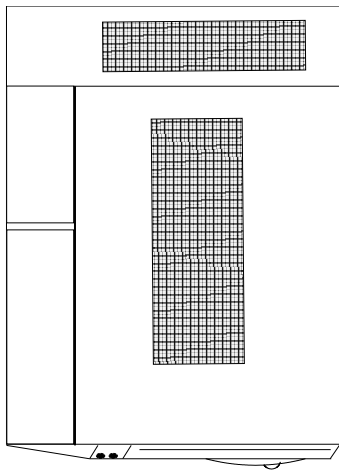
D7-F50 / F75 / 100 Plumbing		
Hose	Plumbing	Description
	Air Compressor Outlet to Compressed Air Tank Inlet	Up to 10 feet of Flexible Hose Provided by Liberty Systems and Installed by customer
	High pressure dry air outlet to application	Provided by and installed by customer

D7-F150 Plumbing



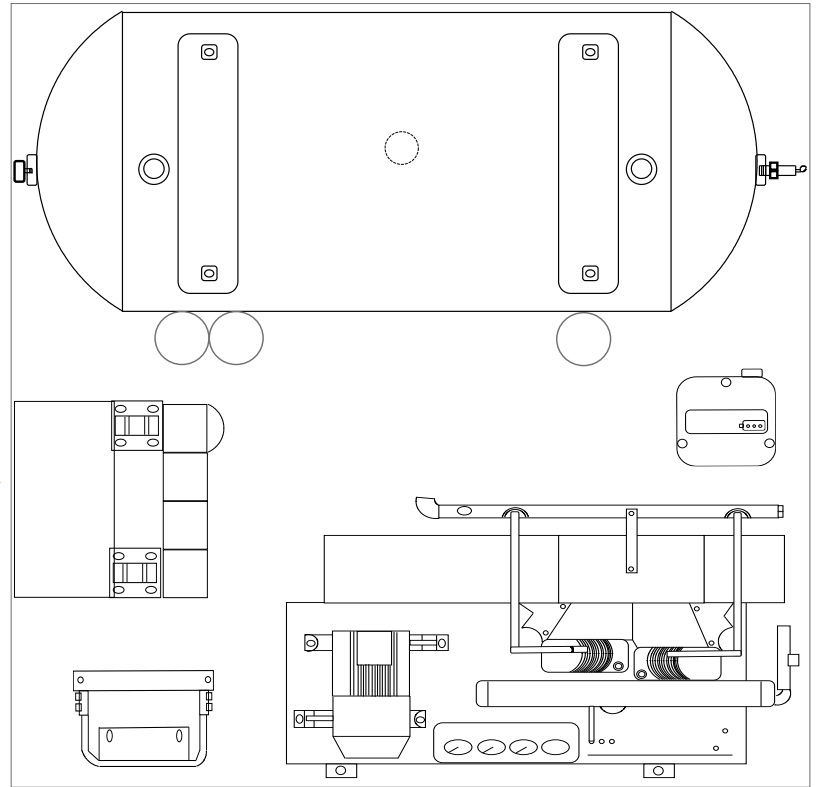
D7-F150 Plumbing		
Hose	Plumbing	Description
	Air Compressor Outlet to Compressed Air Tank Inlet	Up to 10 feet of Flexible Hose Provided by Liberty Systems and Installed by customer
	High Pressure Dry Air	Up to 10 feet of Flexible Hose Provided by Liberty Systems and Installed by customer
	High Pressure Dry Air Outlet to Application	Provided by and Installed by Customer

**D7-F50 / F75 / F100 Power\***



460 / 3 / 60

460 / 3 / 60



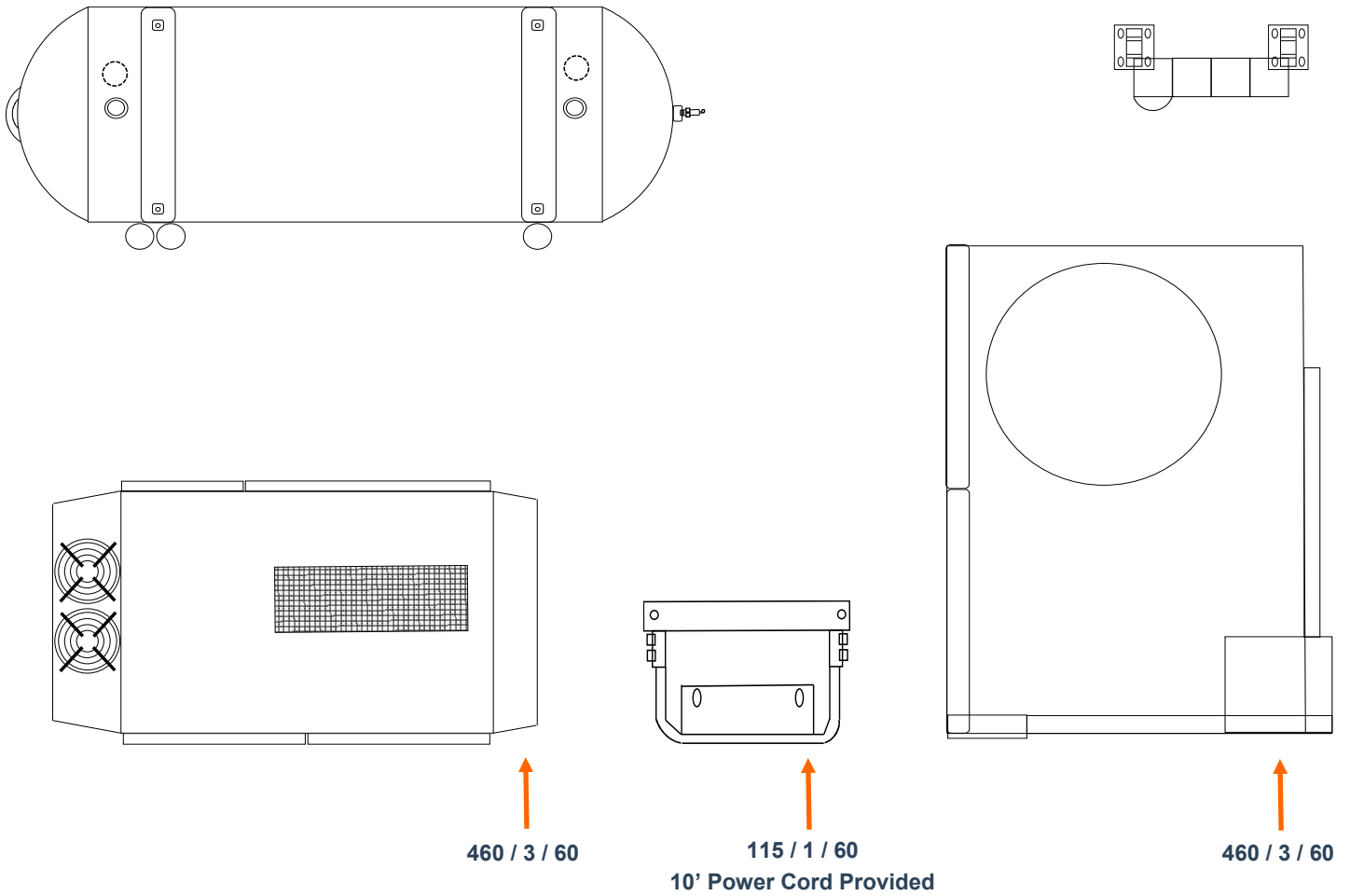
115 / 1 / 60  
10' Power Cord Provided

D7-F50 Power			
	Package Full Load Amps	Recommended Disconnect Fuse Size	Recommended Disconnect Wire Size
Air Compressor	32	45	8 AWG per Phase and Ground
Desiccant Air Dryer	1.3	15	14 AWG
Nitrogen Booster	17.6	25	10 AWG
D7-F75 Power			
Air Compressor	39	50	6 AWG per Phase and Ground
Desiccant Air Dryer	1.3	15	14 AWG
Nitrogen Booster	24.6	40	10 AWG per Phase and Ground
D7-F100			
Air Compressor	43	60	4 AWG per Phase and Ground
Desiccant Air Dryer	1.3	15	14 AWG
Nitrogen Booster	24.6	40	10 AWG per Phase and Ground

**\*Power Requirements Must be Verified at Time of Purchase**



D7-F150 Power



D7-F150			
	Package Full Load Amps	Recommended Disconnect Fuse Size	Recommended Disconnect Wire Size
Air Compressor	67	100	3 AWG per Phase and Ground
Desiccant Air Dryer	1.3	15	14 AWG
Nitrogen Booster	38.5	60	6 AWG per Phase and Ground

**\*Power Requirements Must be Verified at Time of Purchase**



**D7-F100**



**D7-F150**



**D7-F75**



**D7-F75**



**D13NU**



**D5-F50**

## Selection

Determining the proper size of a dry air assist generator is not as simple as it seems. The local compressed air guy certainly knows a lot (we hope) about compressed air systems. They may even be able to get an engineer on a conference call to explain how the system works but it is unlikely they know anything about lasers, whether it be a fiber, CO2 or DDL, we have been living metal fab for more than 15 years. Ask your local distributor what nozzle size or federate is for a given material and you will probably get a blank stare. Are you are looking for a piece of equipment or a solution.

We ask the right questions to ensure you are getting what you want. We have working partnerships with most of the laser OEM's, their dealers and distributors for a reason. We design, build and produce the most reliable dry air assist and nitrogen generators...Period.

## Cost Analysis

Every solution we provide comes with a cost analysis. We try to gather as much information as possible to show a true representation of the money saved when investing into a dry air assist generator from Liberty Systems. For us to be accurate we will typically request what you currently pay for liquid N2, cost of your power, hours of operation, what material types you process and how thick. We include in the analysis the anticipated preventative maintenance costs and power.

Below is a Liberty Systems customer cutting 1/4". Power cost is \$0.10 per kWh, operating 4000-6000 hours per year. The client was contractually held hostage by the gas company paying an absurd amount of \$0.80 per ccf for the bulk supply of liquid nitrogen. Less than 12 months return on investment, \$100K or more savings annually, now that is ROI!

Analysis			
Monthly Liquid Nitrogen Expense (LN2)		Dry Air Assist (DAA) Cost Analysis	
Current Cost per 100 cubic feet (ccf)	\$0.80	Dry Air Assist Cost per Hour	\$3.98
Rental Fees Per Bulk Tank	\$750.00	Monthly Cost	\$1,327.00
Rental Fees Per Trifecta	\$750.00	Annual Cost	\$15,927.00
Deliveries Per Month	2	<b>Cost per Hundred Cubic feet</b>	<b>\$0.20</b>
Delivery, Hazmat Fees	\$50.00		
<b>Monthly Rental / Delivery and Han-</b>	<b>\$1,600.00</b>		
Liquid Nitrogen Cost Analysis		Dry Air Assist ROI	
Liquid Nitrogen Cost per hour	\$24.40	<b>GN2 Cost per Hour</b>	<b>\$6.33</b>
Monthly Cost	\$9.733	<b>LN2 Cost per Hour</b>	<b>\$44.50</b>
<b>Annual Cost</b>	<b>\$116,800</b>	<b>Annual Savings</b>	<b>\$100,873.00</b>
		<b>ROI in Months</b>	<b>10</b>

## Gas Contracts

Do you feel trapped locked into a 7 year product supply agreement with an evergreen clause and unlimited price increases?

With the explosion of fiber lasers in the past few years, we have been watching as gas consumption of those lasers increase. What does that mean? That means that you will most likely be paying more every month for nitrogen. Who is pleased about this? You guessed it, the industrial gas suppliers. They are in the business to make profits. Where do they get that profit from?

I certainly would not want to be locked into agreement like that, but what can you do? All the industrial gas suppliers have the same evergreen clause. It is like all the CEO's of the gas companies were at the country club one day after a round of golf, drinking bourbon and smoking \$100 cigars and the conversation went like this.

CEO #1: "hey, we should make the product supply agreements 7 years".

CEO #2: "yeah, and we should make it almost impossible to get out of it, how about an evergreen clause that renews the contract"?

CEO #3: "That is perfect, we also need to make sure we can give the customer unlimited price increases".

What if you could produce your own nitrogen gas, as much as you need 24 hours per day, 7 days per week? What if you had an in house Nitrogen generator? No more need for that 7 year industrial gas product supply agreement.

For more information about opportunities regarding your application, please contact us or visit our website.

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