



FBP Treatment Systems

Delivering Food, Beverage and
Pharmaceutical Grade Compressed Air



ENGINEERING YOUR SUCCESS.

Food/Beverage/Pharmaceutical Grade Compressed Air

In Food/Beverage/Pharmaceutical manufacturing, the uses of compressed air differs from those of general industrial manufacturing in that the compressed air often directly or in-directly contacts manufacturing equipment, ingredients,

finished products and packaging. These applications therefore require an air purity specification that will protect both consumer and manufacturer.

Definition: Direct Contact

Compressed air that directly contacts manufacturing equipment, production surfaces, ingredients, finished product or packaging materials.

Examples of Direct Contact

- Sparging
- Air knives (cutting/peeling/cooling)
- Spraying/coating
- Conveying (movement)
- Direct cooling
- Packaging
- Drying

Definition: In-direct Contact

Compressed air that is not supposed to come into contact with manufacturing equipment, production surfaces, ingredients, finished product or packaging materials, but may inadvertently do so.

Examples of In-direct Contact

- Valves, cylinders and pneumatics operating in the manufacturing environment where the contaminated exhaust air can then inadvertently contact manufacturing equipment, production surfaces, ingredients, finished product or packaging materials.

Recommended Minimum Air Quality Classifications

Compressed Air Usage	ISO 8573-1:2010 Classification	Solid Particulate			Water	Oil
		Maximum Number of Particles per m ³			Pressure Dewpoint	Total Oil (Aerosol, liquid and vapour)
		0.1µ ~ 0.5µ	0.5µ ~ 1.0µ	1.0µ ~ 5.0µ	°C PDP	mg/m ³
Direct Contact	Class 1:2:1	≤20,000	≤400	≤10	≤ -40°C PDP	≤0.01 mg/m ³
In-direct Contact	Class 1:2:1	≤20,000	≤400	≤10	≤ -40°C PDP	≤0.01 mg/m ³

Recommended Parker Products

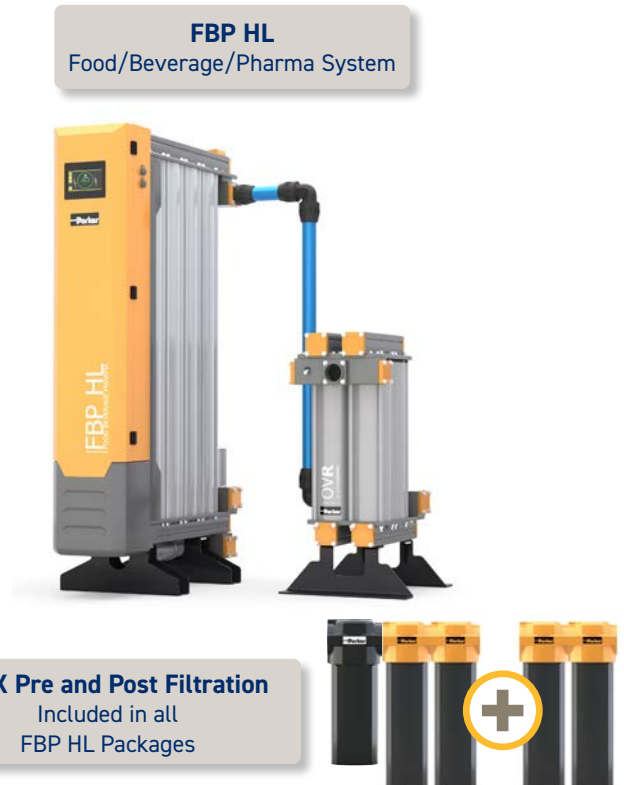
Application	Direct Contact		In-direct Contact	
	Recommended ISO 8573-1:2010 Purity Classifications	Recommended Parker Compressed Air Treatment Products	Recommended ISO 8573-1:2010 Purity Classifications	Recommended Parker Compressed Air Treatment Products
Food/Beverage/ Pharmaceutical Grade Air Plant Scale Protection to Ring Main	Class 1:2:1	FBP HL 100 - 170 FBP LE 100 - 170	Class 1:2:1	FBP HL 100 - 170 FBP LE 100 - 170
Food/Beverage/ Pharmaceutical Grade Air Plant Scale Protection to Point of Use	Class 1:2:1	FBP HL 100 - 170 + OIL-X Grade AA(M) and Grade OVR at Point of Use FBP LE 100 - 170 + OIL-X Grade AA(M) and Grade OVR at Point of Use	Class 1:2:1	FBP HL 100 - 170 + OIL-X Grade AA(M) and Grade OVR at Point of Use FBP LE 100 - 170 + OIL-X Grade AA(M) and Grade OVR at Point of Use
Food/Beverage/ Pharmaceutical Grade Air Treatment at Point of Use	Class 1:2:1	FBP HL 050 - 085	Class 1:2:1	FBP HL 050 - 085
Sterile Compressed Air	Above plus Point of Use TETPOR II Membrane Filter at each critical usage point			
Respiratory Protection	For Breathable Quality Compressed Air to EN12021 or European Pharmacopeia use Parker BAS / BAM / BSP Product Ranges			

Parker FBP - Food/Beverage/Pharmaceutical Treatment Systems

At the heart of any compressed air treatment solution is the dryer, its purpose, to remove water vapour, stop condensation, corrosion and in the case of adsorption dryers, inhibit the growth of micro-organisms.

Heatless adsorption dryers (also known as PSA dryers) are the simplest type of adsorption dryer available and have long been the dryer of choice for many industries and applications. They are simple, reliable and cost effective and for small to medium flow systems, often the only viable technology available. Additionally, modular heatless dryers provide even more reliable, smaller, more compact and lightweight dryers, which can be installed in both the compressor room or at the point of use.

FBP air treatment systems provide clean, oil-free and dry compressed air in accordance with all editions of ISO 8573-1, the international standard for compressed air quality. They are energy efficient and use a modular construction making them less than half the size of conventional dryers.



Features and Benefits

No Heat Required

- As the name suggests, heatless dryers do not use any heat during the regeneration process and do not require a cool down phase.
- Using heat requires insulation to keep the heat in the adsorption bed during regeneration and a cooling phase to remove the heat before adsorption begins again.
- A hot desiccant bed reduces adsorption capacity and can affect the outlet dewpoint on changeover (a problem with ambient air cooled blower dryers, unless costly cool down air is used).
- Heated dryers are typically more complicated than a heatless equivalent.

Clean, Dry Regeneration Air

- Utilising, clean dry 'purge air' for regeneration protects the adsorption bed from ambient contamination and prevents the introduction of these contaminants downstream (unlike regeneration methods using untreated ambient air).

Robust and Reliable

- Simple regeneration means fewer components and increased reliability.

Modular Aluminium Construction

- Modular aluminium construction means a smaller, more compact and lightweight dryer compared to conventional steel dryers.
- 100% standby at a fraction of the cost of twin tower designs.
- 10 year guarantee on pressure envelope
- Corrosion resistance due to anodising and dry powder epoxy coating.
- Consistent outlet dewpoint performance thanks to snowstorm filling of adsorbent desiccant material.

Approvals to International Standards

- PED/CE, UL/FCC, AS1210/RCM and MOM.

Field Upgradable

- To low energy vacuum assisted option (LE).

Advantages of a Parker FBP Treatment System

Parker FBP HL and FBP LE treatment systems have been designed to deliver compressed air purity levels suitable for both direct and in-direct contact applications.



Independently Verified by LRQA (formerly Lloyds Register)

- ISO 8573-1:2010 Class 1:2:0 (Direct Contact)
- ISO 8573-1:2010 Class 1:2:0 (In-direct Contact)
- BCAS BPG 102-1 & BCAS BPG 109 (Direct Contact)
- BCAS BPG 102-1 & BCAS BPG 109 (In-direct Contact)

Materials of Construction

- FDA Title 21 Compliance
- EC1935/2004 Exemption



Advantages

- Consists of 7 stages of purification.
- Treats all 10 of the common compressed air contaminants.
- Provides a constant outlet dewpoint ($\leq -40^{\circ}\text{C}$ PDP) proven to inhibit the growth of microorganisms.
- Includes general purpose and high efficiency dry particulate outlet filters (treatment down to 0.01 micron) for the capture of up to 99.9999% of solid particles, including microorganisms.
- Utilises clean, dry purge air for regeneration.
- Exceeds the British Compressed Air Society (BCAS) recommendations for Food and Beverage Grade Compressed Air and Pharmaceutical Grade Compressed Air (Direct Contact and In-direct Contact) as defined in Best Practice Guides 102-1 & 109.



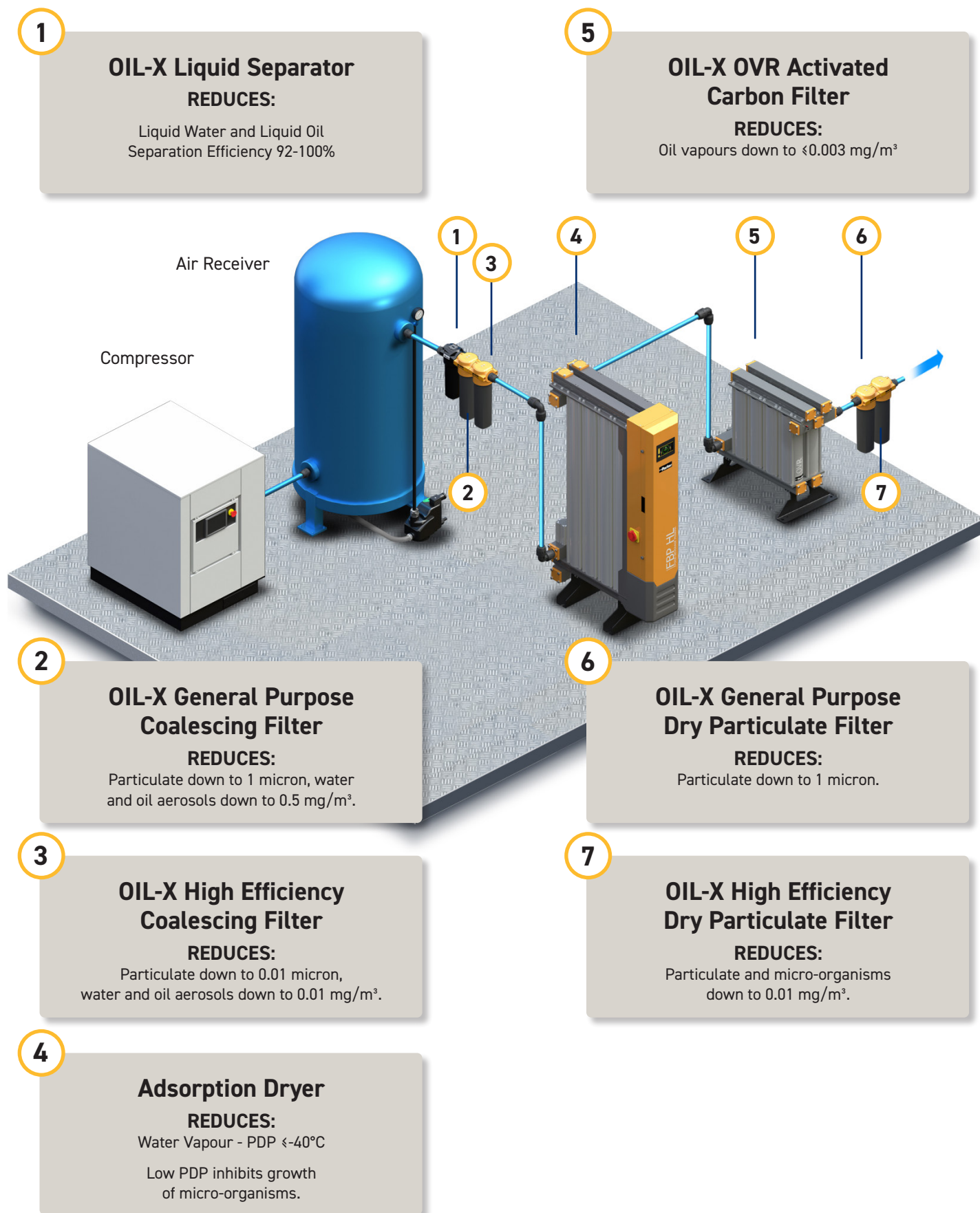
- Delivers compressed air purity to ISO 8573-1:2010 Class 1:2:0.

- Provides 'technically oil-free' compressed air to ISO 8573-1:2010 Class 0 for total oil ($\leq 0.003 \text{ mg/m}^3$) from any type of compressor

- Comes with 3rd party validated performance, FDA Title 21 Compliance certification and EC1935/2004 exemption certification.

- Available for plant scale protection or for point of use protection.
- Dewpoint measurement and display as standard.
- Two energy management systems included as standard.
- Includes MODBUS connectivity as standard on all models, with additional IIoT protocols available on models FBP 100-170.

FBP Food/Beverage/Pharmaceutical Treatment Systems consist of 7 stages of purification treating 10 contaminants found in a compressed air system.



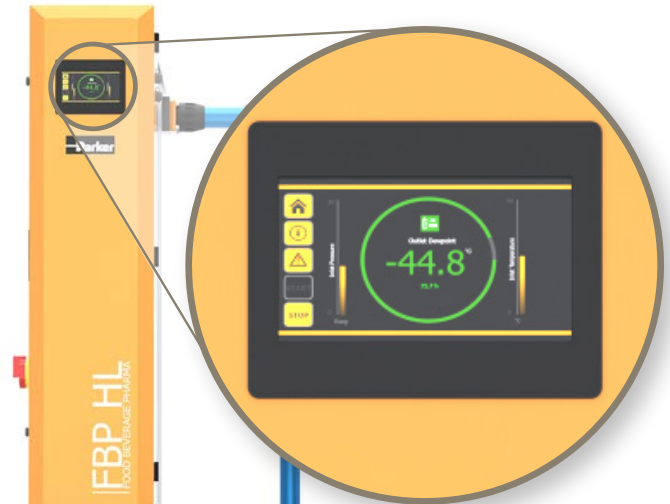
Advanced Controller

Advanced food, beverage and pharmaceutical grade compressed air treatment systems demand an advanced control system.

It is critical that the compressed air used for Direct Contact and In-direct Contact applications in the food, beverage or pharmaceutical industries is treated to a level that will protect both the consumer and the manufacturer.

Ensuring that the compressed air is always within specification and maintenance regimes are adhered to requires an advanced control system. One that not only controls the function of the treatment system, but also constantly monitors and advises its status to plant personnel and/or service providers.

Modern industry is currently in the midst of change, with increased connectivity between devices becoming common place. This digital connectivity allows plant equipment to share data via remote monitoring services, however there are many connectivity methods and communication protocols available which are not always compatible with each other.

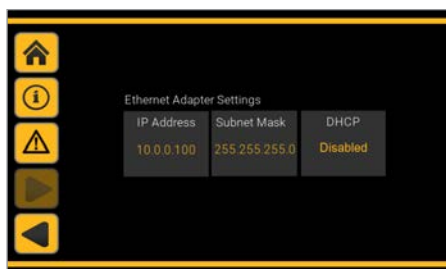


The FBP Advanced Controller offers multiple connection methods and modern IIoT communication protocols, with the option of custom protocols and cloud connectivity via additional gateways.

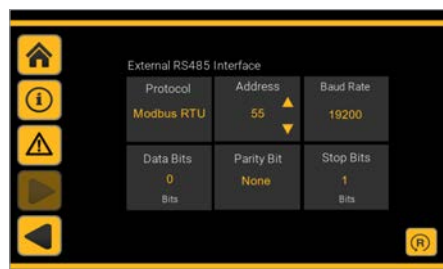
Controller Connectivity

Dryer Range / Connectivity	PLC / 7" TFT Colour Touchscreen	Web Server via Ethernet RJ45	Modbus TCP/IP via Ethernet RJ45	Modbus RTU via 2 wire RS485	Dewpoint Hygrometer with 4-20 mA Dewpoint Retransmission	Fault Alarm Relay
FBP HL 100-170	•	•	•	•	•	•
FBP LE 100-170	•	•	•	•	•	•

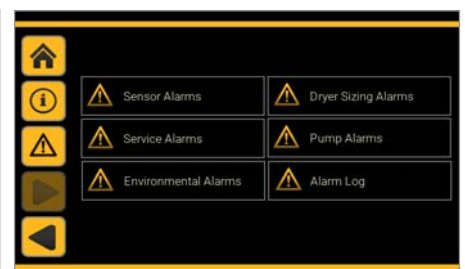
Examples of the FBP Advanced Controller's Touchscreen Displays



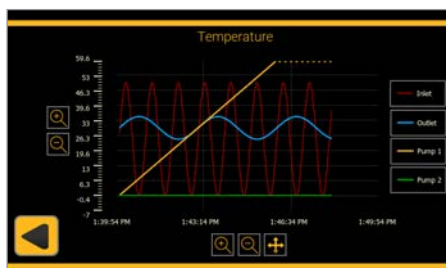
Network Configuration Settings (Ethernet)



Network Configuration Settings (RS485)



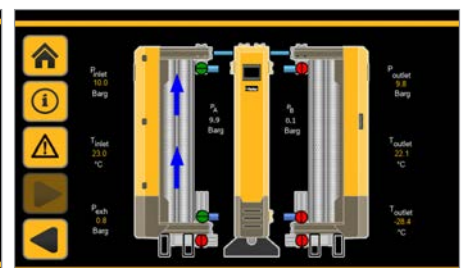
Available Alarm Displays



Operational Temperature Trends



Dewpoint Display



Dryer Operation Status

Energy Saving as Standard

FBP compressed air treatment systems include two energy management systems as standard, DDS-EST and Purge Economy.

Dewpoint Dependent Switching: Energy Saving Technology (DDS-EST)

The energy required to regenerate the off-line desiccant bed of an absorption dryer is constant, and based upon the assumption that the dryer is operating at full capacity and the desiccant bed requiring regeneration has been fully saturated.

In reality, a dryer is rarely operating at full capacity all of the time, for example during shift work and periods of low demand.

Daily and seasonal fluctuations in ambient temperature and humidity also change the moisture loading placed upon the dryer.

Under such conditions, at the point in the drying cycle where the air flow is switched from one drying chamber to the other, there is the potential for drying capacity to remain in the desiccant material about to undergo regeneration.

As the energy used to regenerate this partially saturated bed is based upon the assumption that the bed is fully saturated, more energy (purge air) is consumed than is actually necessary.

Proportional Energy Usage

Parker's Dewpoint Dependent Switching - Energy Saving Technology ensures the energy consumed by the dryer is directly proportional to the amount present and not the dryer's maximum rated capacity.

This example highlights the percentage energy savings available with the DDS-EST in operation.

Example based upon dryer sized for minimum system pressure: 6.5 bar g, maximum inlet temperature: 35°C, 100% dryer flow rate.
Average pressure: 7.5 bar g, average temperature: 30°C, average flow: 50% - 100%. Duration of operation: 8736 hours.

DDS-EST not only provides energy savings, it provides environmental savings too!

This example highlights the potential energy savings (in kW) and environmental savings (in kg/CO₂) over a 12 month period of operation.

Example based upon FBP HL 130.
Minimum system pressure: 6.5 bar g, maximum inlet temperature: 35°C, 100% dryer flow rate.
Average pressure: 7.5 bar g, average temperature: 30°C, average flow: 50% - 100%. Duration of operation: 8736 hours.

% Flow	% Energy Saving					
	35°C	30°C	25°C	20°C	15°C	10°C
100	14%	35%	52%	65%	74%	81%
90	23%	42%	57%	68%	77%	83%
80	31%	48%	62%	72%	79%	85%
70	40%	55%	66%	75%	82%	87%
60	49%	61%	71%	79%	85%	89%
50	57%	68%	76%	82%	87%	91%

Air Demand %	Energy Saving %	Energy Saving P/A kW	Environmental Saving P/A Kg / CO ₂
100	35	69,236	37,388
90	42	83,084	44,865
80	48	94,953	51,274
70	55	108,800	58,752
60	61	120,669	65,161
50	68	134,516	72,639

Purge Economy: Energy Saving Technology

As standard, FBP compressed air treatment systems are supplied with not one, but two energy saving technologies. Purge Economy compliments the DDS-EST system and allows for additional energy savings to be made when the compressor is off-load, for example during evenings and weekends.



FBP LE - Low Energy Vacuum Assisted Heatless Dryers

The purge air requirement for the heatless vacuum assisted dryer is reduced from around 20% to 3% of the dryer's literature reference conditions.

Energy reductions from reducing the purge air offsets the energy required to operate the vacuum pump, and provides significant energy savings overall.

FBP LE heatless vacuum assisted dryers operate almost identically to a standard heatless dryer, however their design includes two additional components, a vacuum valve and a vacuum pump.

Features and Benefits

It's a Heatless Dryer!

- All of the aforementioned benefits a heatless modular aluminium dryer.
- Uses clean, dry, purge air for desiccant regeneration.
- No heat used for regeneration.
- No cooling phase required.
- No thermal protection devices or protective insulation required.

Less Purge Air Required for Regeneration

- Lower air usage, compared to equivalent heatless and heated purge air dryers.
- Up to 17% more compressed air delivered to the application, compared to a standard heatless equivalent.

Energy Savings

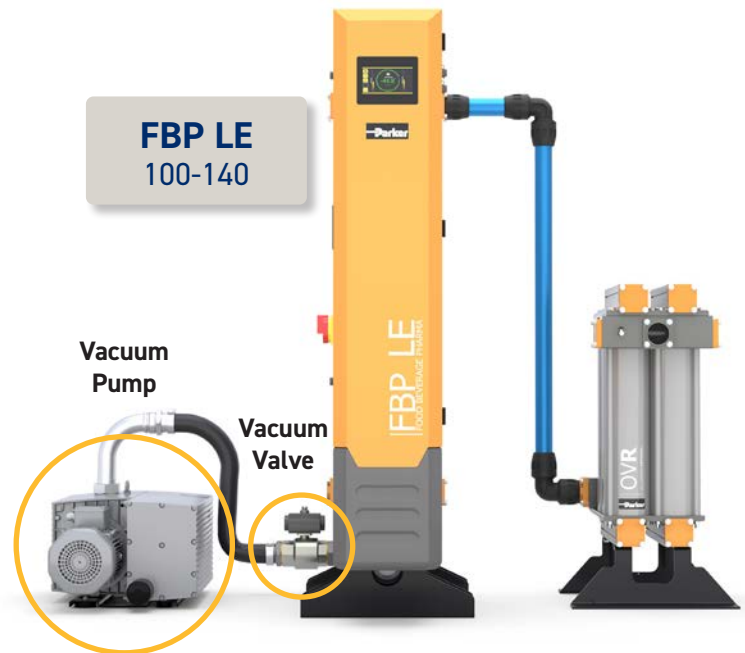
- On average 63% lower energy consumption, compared to a standard heatless equivalent.

Heatless Fallback Mode

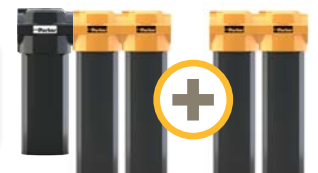
- Should a problem arise with the vacuum pump, unlike more complicated dryer technologies, FBP LE dryers can be immediately set up in fully heatless mode to ensure a continuous supply of dry air is always available.

Can use existing centralised vacuum system

- If a centralised vacuum system is already available on-site, FBP vacuum assisted heatless dryers can be connected to the system, reducing capital costs even further.



OIL-X Pre and Post Filtration
Included in all
FBP LE Packages



Multi-Banking

FBP compressed air treatment systems provide greater flexibility with multi-banking.

Unlike traditional twin tower dryer designs, all FBP 100-170 models can be multi-banked to provide extra compressed air drying capacity.

Should demand increase in the future, there is no need to replace the dryer with a larger unit, additional capacity can be covered by simply adding extra dryer modules (banks).

3 x FBP LE
Multi-bank
Configuration



Flexibility

Multi-banking allows individual dryer banks to be easily isolated for routine service work, whilst maintaining your clean, dry air supply.

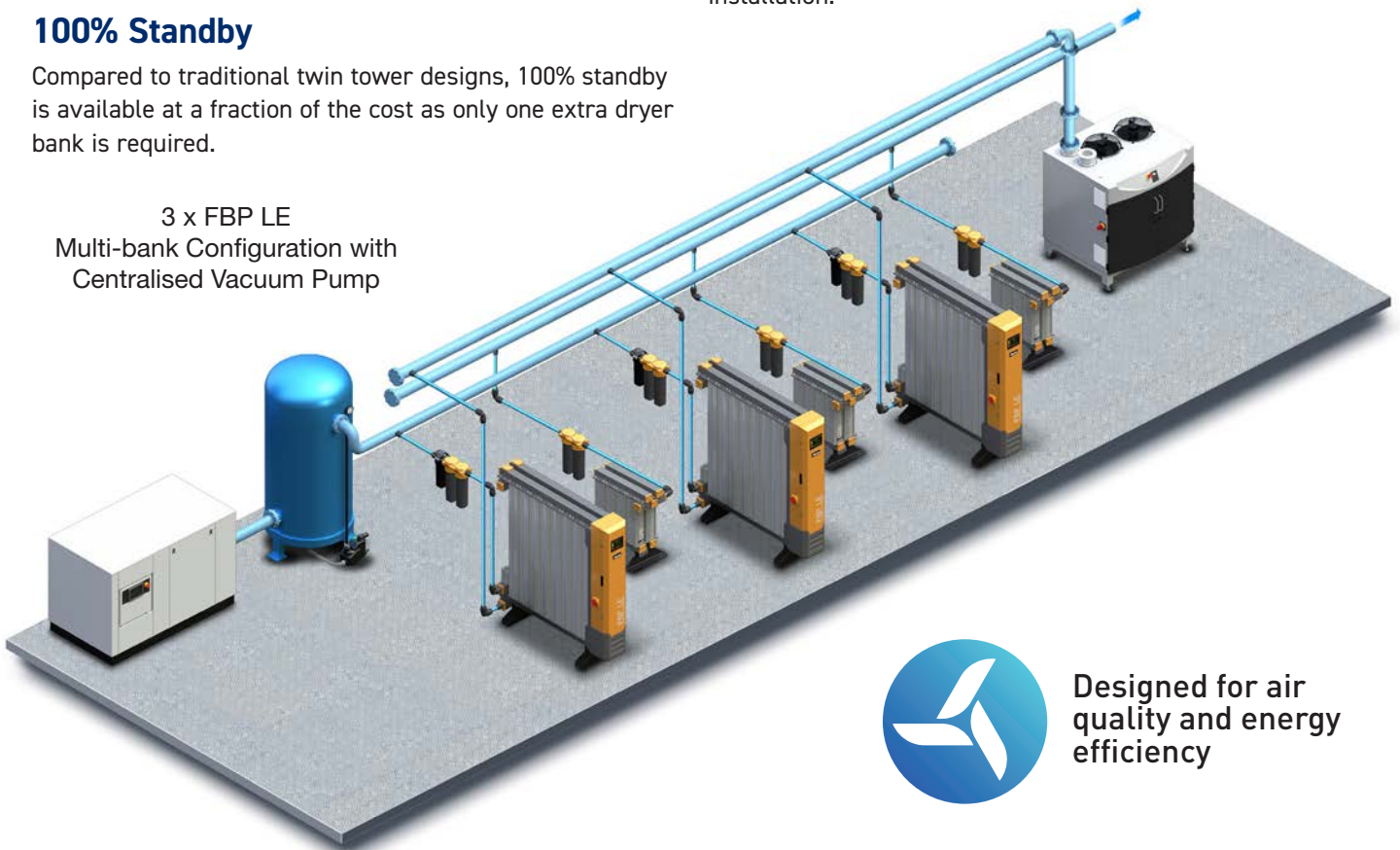
Ease of Installation

Unlike traditional twin tower designs, modular dryers will fit through a standard doorway, eliminating the need for special access or facility structural dismantling during installation.

100% Standby

Compared to traditional twin tower designs, 100% standby is available at a fraction of the cost as only one extra dryer bank is required.

3 x FBP LE
Multi-bank Configuration with
Centralised Vacuum Pump



Designed for air
quality and energy
efficiency

Dryer Performance - FBP HL 100-170

Dryer Models	Dewpoint (Standard)		ISO 8573-1:2010 Classification (Standard)	Dewpoint (Option 1)		ISO 8573-1:2010 Classification (Option 1)
	°C	°F		°C	°F	
FBP HL 100 - FBP HL 170	-40	-40	Class 1:2:0	-70	-100	Class 1:1:0

ISO 8573-1 Classifications when used with Parker OIL-X pre/post filtration

Technical Data

Dryer Models	Minimum Operating Pressure		Maximum Operating Pressure		Minimum Operating Temperature		Maximum Operating Temperature		Maximum Ambient Temperature		Electrical Supply (Standard)	Electrical Supply (Optional)	Thread Type	Noise Level
	bar g	psi g	bar g	psi g	°C	°F	°C	°F	°C	°F				dB(A)
FBP HL 100 - FBP HL 170	5	73	13	190	5	41	50	122	55	131	100-240V (+/-10%) 1ph 50/60Hz	-	BSPP	<75

Flow Rates

Model	Pipe Size	Inlet Flow Rate			
		L/s	m³/min	m³/hr	cfm
FBP HL 100	2"	113	6.81	408	240
FBP HL 110	2"	170	10.22	612	360
FBP HL 120	2½"	213	12.75	765	450
FBP HL 130	2½"	283	17	1020	600
FBP HL 140	2½"	354	21	1275	750
FBP HL 150	2½"	425	26	1530	900
FBP HL 160	3"	496	30	1785	1050
FBP HL 170	3"	567	34	2040	1200
2 x FBP HL 140	2½"	708	43	2550	1500
2 x FBP HL 150	2½"	850	51	3060	1800
2 x FBP HL 160	3"	992	60	3570	2100
2 x FBP HL 170	3"	1133	68	4080	2400
3 x FBP HL 150	2½"	1275	77	4590	2700
3 x FBP HL 160	3"	1488	89	5355	3150
3 x FBP HL 170	3"	1700	102	6120	3600

Stated flows are for operation at 7 bar (g) (102 psi g) with reference to 20°C, 1 bar (a), 0% relative water vapour pressure. For flows at other pressures, apply the correction factors shown below.

For correct operation, compressed air dryers must be sized for the maximum (summer) inlet temperature, maximum (summer) ambient temperature, minimum inlet pressure, required outlet dewpoint and maximum flow rate of the installation.

CFMIT - Correction Factor Maximum Inlet Temperature

Maximum Inlet Temperature	°C	25	30	35	40	45	50
	°F	77	86	95	104	113	122
Correction Factor		1.00	1.00	1.00	1.04	1.14	1.37

To select a dryer, first calculate the Minimum Drying Capacity (MDC) using the formula below then select a dryer from the flow rate table above with a flow rate equal to or above the MDC.

CFMAT - Correction Factor Maximum Ambient Temperature

Maximum Ambient Temperature	°C	25	30	35	40	45	50
	°F	77	86	95	104	113	122
Correction Factor		1.00	1.00	1.00	1.00	1.00	1.00

Minimum Drying Capacity (MDC) =

Max System Flow x CFMIT x CFMAT x CFMIP x CFOD

CFMIP - Correction Factor Minimum Inlet Pressure

Minimum Inlet Pressure	bar g	5	6	7	8	9	10	11	12	13
	psi g	73	87	100	116	131	145	160	174	189
Correction Factor		1.33	1.14	1.00	0.89	0.80	0.73	0.67	0.62	0.57

CFOD - Correction Factor Outlet Dewpoint

Outlet Dewpoint	°C	-40	-70
	°F	-40	-100
Correction Factor		1.00	1.43

Controller Main Functions

Dryer Models	Controller Function							
	Touchscreen + PLC Controller	Inlet Pressure, Temp. & Outlet Dewpoint Monitoring	DDS Energy Saving Technology	Filter and Dryer Service Indicators	Web Interface via RJ45 Ethernet	IIOT Connectivity	4-20mA Outputs	Fault Alarm Relay
FBP HL 100 - FBP HL 170	●	●	●	●	●	●	●	●

Items Included/Required to Create FBP HL Package

Product	Required - To be ordered separately	Included
OIL-X Grade WS		●
OIL-X Grade AO General Purpose Coalescing Filter		●
OIL-X Grade AA High Efficiency Coalescing Filter		●
FBP Adsorption Dryer		●
OVR Oil Vapour Reduction Filter		●
OIL-X Grade AO General Purpose Dry Particulate Filter		●
OIL-X Grade AA High Efficiency Dry Particulate Filter		●
Inlet/Outlet Piping (Parker Transair aluminium piping recommended)	●	

Included Filtration

Model	Filter Connections BSPP	Dryer Inlet			Dryer Outlet		
		Liquid Separator	General Purpose Coalescing Filter	High Efficiency Coalescing Filter	Oil Vapour Reduction Filter	General Purpose Dry Particulate Filter	High Efficiency Dry Particulate Filter
FBP HL 100	2"	WSPX040HGT1X	AOPX040HGFX	AAPX040HGFX	OVRP350HGXX	AOPX040HGMX	AAPX040HGMX
FBP HL 110	2"	WSPX040HGT1X	AOPX040HGFX	AAPX040HGFX	OVRP400HGXX	AOPX040HGMX	AAPX040HGMX
FBP HL 120	2½"	WSPX045IGT1X	AOPX045IGFX	AAPX045IGFX	OVRP400IGXX	AOPX045IGMX	AAPX045IGMX
FBP HL 130	2½"	WSPX045IGT1X	AOPX045IGFX	AAPX045IGFX	OVRP400IGXX	AOPX045IGMX	AAPX045IGMX
FBP HL 140	2½"	WSPX050IGT1X	AOPX050IGFX	AAPX050IGFX	OVRP450IGXX	AOPX050IGMX	AAPX050IGMX
FBP HL 150	2½"	WSPX050IGT1X	AOPX050IGFX	AAPX050IGFX	OVRP450IGXX	AOPX050IGMX	AAPX050IGMX
FBP HL 160	3"	WSPX055JGT1X	AOPX055JGFX	AAPX055JGFX	OVRP500JGXX	AOPX055JGMX	AAPX055JGMX
FBP HL 170	3"	WSPX055JGT1X	AOPX055JGFX	AAPX055JGFX	OVRP500JGXX	AOPX055JGMX	AAPX055JGMX

Filtration Performance

Filter	Liquid Separator	General Purpose Pre-filter	High Efficiency Coalescing Filter	Oil Vapour Reduction Filter	General Purpose Dry Particulate Filter	High Efficiency Dry Particulate Filter
Filtration Grade	Grade WS	Grade AO	Grade AA	Grade OVR	Grade AO	Grade AA
Filtration Type	Liquid Separator	Coalescing	Coalescing	Adsorption	Dry Particulate	Dry Particulate
Particle Reduction (inc. water & oil aerosols)	N/A	Down to 1 micron	Down to 0.01 micron	N/A	Down to 1 micron	Down to 0.01 micron
Maximum Remaining Oil Aerosol Content at 21°C	N/A	≤0.5 mg/m³ (≤0.5 ppm(w))	≤0.01 mg/m³ (≤0.01 ppm(w))	N/A	N/A	N/A
Maximum Remaining Oil Vapour Content at System Temperature	N/A	N/A	N/A	≤0.003 mg/m³ (≤0.003 ppm(w))	N/A	N/A
Filtration Efficiency	>92%	99.925%	99.9999%	N/A	99.925%	99.9999%

Required in addition to above - To be ordered separately

Inlet/Outlet Piping (Parker Transair aluminium piping recommended)	FBP HL 100 - FBP HL 170
	●

Dryer Performance - FBP LE 100-170

Dryer Models	Dewpoint (Standard)		ISO 8573-1:2010 Classification (Standard)	Dewpoint (Option 1)		ISO 8573-1:2010 Classification (Option 1)
	°C	°F		°C	°F	
FBP LE 100 - FBP LE 170	-40	-40	Class 1:2:0	-70	-100	Class 1:1:0

ISO 8573-1 Classifications when used with Parker OIL-X pre/post filtration

Technical Data

Dryer Models	Minimum Operating Pressure		Maximum Operating Pressure		Minimum Operating Temperature		Maximum Operating Temperature		Maximum Ambient Temperature		Electrical Supply (Standard)	Electrical Supply (Optional)	Thread Type	Noise Level
	bar g	psi g	bar g	psi g	°C	°F	°C	°F	°C	°F				
FBP LE 100 - FBP LE 170	5	73	13	190	5	41	50	122	55	131	400V +/-10% 3PH 50Hz	460V +/-10% 3PH 60Hz	BSPP	<75

Flow Rates

Model	Pipe Size	Inlet Flow Rate			
		L/s	m³/min	m³/hr	cfm
FBP LE 100	2"	113	6.81	408	240
FBP LE 110	2"	170	10.22	612	360
FBP LE 120	2½"	213	12.75	765	450
FBP LE 130	2½"	283	17	1020	600
FBP LE 140	2½"	354	21	1275	750
FBP LE 150	2½"	425	26	1530	900
FBP LE 160	3"	496	30	1785	1050
FBP LE 170	3"	567	34	2040	1200
2 x FBP LE 140	2½"	708	43	2550	1500
2 x FBP LE 150	2½"	850	51	3060	1800
2 x FBP LE 160	3"	992	60	3570	2100
2 x FBP LE 170	3"	1133	68	4080	2400
3 x FBP LE 150	2½"	1275	77	4590	2700
3 x FBP LE 160	3"	1488	89	5355	3150
3 x FBP LE 170	3"	1700	102	6120	3600

Vacuum Pump Part Number and kW

Vacuum Pump 50Hz / 60Hz	kW @ 50Hz	kW @ 60Hz
HLVAP-OL-02-100	3	3.6
HLVAP-OL-02-110	3	3.6
HLVAP-OL-02-120	4	4.8
HLVAP-OL-02-130	5.5	6.6
HLVAP-OL-02-140	5.5	6.6
HLVAP-OL-02-150	7	8.4
HLVAP-OL-02-160	8.5	10.2
HLVAP-OL-02-170	9.5	11.4

Dryer and vacuum pump to be ordered separately.
 HLVAP-OL-02-100 to HLVAP-OL-02-140 = Single Pump
 HLVAP-OL-02-150 to HLVAP-OL-02-170 = Duplex Pump
 (Duplex = 2 x pumps supplied on frame)
 Multi-bank dryer installations require multiples vacuum pumps.
 For example, 3 x OFAS LE 170 requires 3 x HLVAP-OL-02-170 pumps or alternatively consider connection to a centralised vacuum system.

Stated flows are for operation at 7 bar (g) (102 psi g) with reference to 20°C, 1 bar (a), 0% relative water vapour pressure. For flows at other pressures, apply the correction factors shown below.

For correct operation, compressed air dryers must be sized for the maximum (summer) inlet temperature, maximum (summer) ambient temperature, minimum inlet pressure, required outlet dewpoint and maximum flow rate of the installation.

CFMIT - Correction Factor Maximum Inlet Temperature

Maximum Inlet Temperature	°C	25	30	35	40	45	50
	°F	77	86	95	104	113	122
Correction Factor		1.00	1.00	1.00	1.04	1.14	1.37

To select a dryer, first calculate the Minimum Drying Capacity (MDC) using the formula below then select a dryer from the flow rate table above with a flow rate equal to or above the MDC.

CFMAT - Correction Factor Maximum Ambient Temperature

Maximum Ambient Temperature	°C	25	30	35	40	45	50
	°F	77	86	95	104	113	122
Correction Factor		1.00	1.00	1.00	1.00	1.00	1.00

Minimum Drying Capacity (MDC) =

Max System Flow x CFMIT x CFMAT x CFMIP x CFOD

CFMIP - Correction Factor Minimum Inlet Pressure

Minimum Inlet Pressure	bar g	5	6	7	8	9	10	11	12	13
	psi g	73	87	100	116	131	145	160	174	189
Correction Factor		1.33	1.14	1.00	0.89	0.80	0.73	0.67	0.62	0.57

CFOD - Correction Factor Outlet Dewpoint

Outlet Dewpoint	°C	-40	-70
	°F	-40	-100
Correction Factor		1.00	1.43

Controller Main Functions

Dryer Models	Controller Function							
	Touchscreen + PLC Controller	Inlet Pressure, Temp. & Outlet Dewpoint Monitoring	DDS Energy Saving Technology	Filter and Dryer Service Indicators	Web Interface via RJ45 Ethernet	IIOT Connectivity	4-20mA Outputs	Fault Alarm Relay
FBP LE 100 - FBP LE 170	●	●	●	●	●	●	●	●

Items Included/Required to Create FBP LE Package

Product	Required - To be ordered separately	Included
OIL-X Grade WS		●
OIL-X Grade AO General Purpose Coalescing Filter		●
OIL-X Grade AA High Efficiency Coalescing Filter		●
FBP Adsorption Dryer		●
OVR Oil Vapour Reduction Filter		●
OIL-X Grade AO General Purpose Dry Particulate Filter		●
OIL-X Grade AA High Efficiency Dry Particulate Filter		●
HLVAP Vacuum Pump(s) (Includes vacuum valve, 3m vacuum hose and fittings)	●	
Inlet/Outlet Piping (Parker Transair aluminium piping recommended)	●	

Included Filtration

Model	Filter Connections BSPP	Dryer Inlet			Dryer Outlet		
		Liquid Separator	General Purpose Coalescing Filter	High Efficiency Coalescing Filter	Oil Vapour Reduction Filter	General Purpose Dry Particulate Filter	High Efficiency Dry Particulate Filter
FBP LE 100	2"	WSPX040HGT1X	AOPX040HGFX	AAPX040HGFX	OVRP350HGXX	AOPX040HGMX	AAPX040HGMX
FBP LE 110	2"	WSPX040HGT1X	AOPX040HGFX	AAPX040HGFX	OVRP400HGXX	AOPX040HGMX	AAPX040HGMX
FBP LE 120	2½"	WSPX045IGT1X	AOPX045IGFX	AAPX045IGFX	OVRP400IGXX	AOPX045IGMX	AAPX045IGMX
FBP LE 130	2½"	WSPX045IGT1X	AOPX045IGFX	AAPX045IGFX	OVRP400IGXX	AOPX045IGMX	AAPX045IGMX
FBP LE 140	2½"	WSPX050IGT1X	AOPX050IGFX	AAPX050IGFX	OVRP450IGXX	AOPX050IGMX	AAPX050IGMX
FBP LE 150	2½"	WSPX050IGT1X	AOPX050IGFX	AAPX050IGFX	OVRP450IGXX	AOPX050IGMX	AAPX050IGMX
FBP LE 160	3"	WSPX055JGT1X	AOPX055JGFX	AAPX055JGFX	OVRP500JGXX	AOPX055JGMX	AAPX055JGMX
FBP LE 170	3"	WSPX055JGT1X	AOPX055JGFX	AAPX055JGFX	OVRP500JGXX	AOPX055JGMX	AAPX055JGMX

Filtration Performance

Filter	Liquid Separator	General Purpose Pre-filter	High Efficiency Coalescing Filter	Oil Vapour Reduction Filter	General Purpose Dry Particulate Filter	High Efficiency Dry Particulate Filter
Filtration Grade	Grade WS	Grade AO	Grade AA	Grade OVR	Grade AO	Grade AA
Filtration Type	Liquid Separator	Coalescing	Coalescing	Adsorption	Dry Particulate	Dry Particulate
Particle Reduction (inc. water & oil aerosols)	N/A	Down to 1 micron	Down to 0.01 micron	N/A	Down to 1 micron	Down to 0.01 micron
Maximum Remaining Oil Aerosol Content at 21°C	N/A	≤0.5 mg/m³ (≤0.5 ppm(w))	≤0.01 mg/m³ (≤0.01 ppm(w))	N/A	N/A	N/A
Maximum Remaining Oil Vapour Content at System Temperature	N/A	N/A	N/A	≤0.003 mg/m³ (≤0.003 ppm(w))	N/A	N/A
Filtration Efficiency	>92%	99.925%	99.9999%	N/A	99.925%	99.9999%

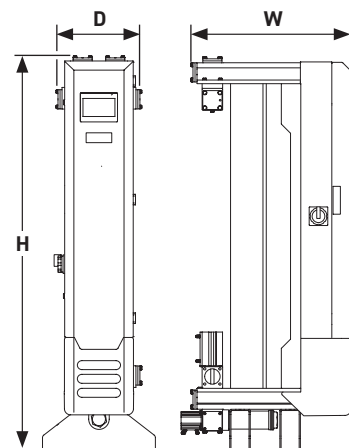
Required in addition to above - To be ordered separately

	FBP LE 100 - FBP LE 170
Vacuum assist pump (FBP/ FBP LE 100 - 170 models only) (Parker HLVAP Vacuum Pump recommended - see table)	●
Inlet/Outlet Piping (Parker Transair aluminium piping recommended)	●

Important Note: FBP models FBP LE 100 - FBP LE 170 will not function in Low Energy mode without a vacuum pump. Vacuum pump MUST be ordered separately along with FBP LE dryer.

Weights and Dimensions (FBP HL and FBP LE - Dryer Only)

Dryer Model	Pipe Size BSPP	Dimensions (Dryer Only)						Weight (Dryer Only)	
		Height (H)		Width (W)		Depth (D)			
		mm	ins	mm	ins	mm	ins	kg	lbs
FBP HL & FBP LE 100	2"	1672	65.8	816	32.1	550	21.7	217	478
FBP HL & FBP LE 110	2"	1672	65.8	987	38.9	550	21.7	277	611
FBP HL & FBP LE 120	2½"	1917	75.5	987	38.9	550	21.7	372	820
FBP HL & FBP LE 130	2½"	1917	75.5	1156	45.5	550	21.7	464	1023
FBP HL & FBP LE 140	2½"	1917	75.5	1325	52.2	550	21.7	555	1224
FBP HL & FBP LE 150	2½"	1917	75.5	1494	58.8	550	21.7	646	1424
FBP HL & FBP LE 160	3"	1917	75.5	1663	65.5	550	21.7	739	1629
FBP HL & FBP LE 170	3"	1917	75.5	1832	72.1	550	21.7	830	1830



Quality Assurance/IP Rating/Pressure Vessel Approvals

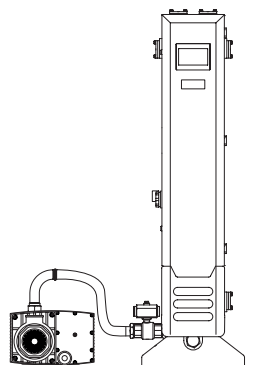
Development/Manufacture	ISO 9001 / ISO 14001 / Materials of Construction FDA Title 21 CFR Compliant and EC1935/2004 Exempt
Ingress Protection Rating	IP44 Indoor Use Only
EU/UK	Pressure vessel approved for fluid group 2 in accordance with the Pressure Equipment Directive 2014/68/EU
USA	Approval to ASME VIII Div. 1 not required
AUS	AS1210

For use with Compressed Air Only

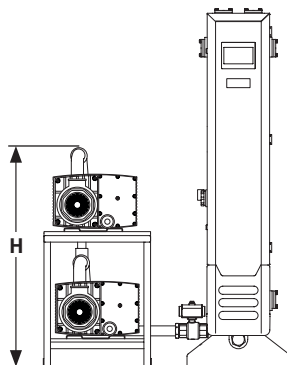
Weights and Dimensions (HLVAP-OL-02 Vacuum Pumps)

Vacuum Pump Model	Vacuum Pump Dimensions							
	Height (H)		Width (W)		Depth (D)		Weight	
	mm	ins	mm	ins	mm	ins	kg	lbs
HLVAP-OL-02-100	400	15.75	933	36.73	523	20.59	89	196
HLVAP-OL-02-110	400	15.75	933	36.73	523	20.59	89	196
HLVAP-OL-02-120	400	15.75	933	36.73	523	20.59	194	428
HLVAP-OL-02-130	400	15.75	933	36.73	523	20.59	184	406
HLVAP-OL-02-140	400	15.75	933	36.73	523	20.59	184	406
HLVAP-OL-02-150	1304	51.34	1100	43.31	560	22.05	420	926
HLVAP-OL-02-160	1304	51.34	1100	43.31	560	22.05	390	860
HLVAP-OL-02-170	1304	51.34	1100	43.31	560	22.05	390	860

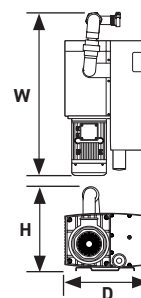
HLVAP-OL-02-100 - HLVAP-OL-02-140
SINGLE VACUUM PUMP



HLVAP-OL-02-150 - HLVAP-OL-02-170
DUPLEX VACUUM PUMP



VACUUM PUMP

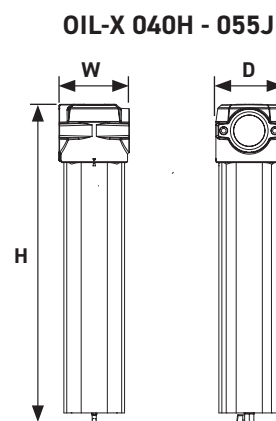


Included Filtration

Dryer Model	OIL-X Filter Grade WS Liquid Separator	OIL-X Filter Grade AO General Purpose Coalescing Filter	OIL-X Filter Grade AA High Efficiency Coalescing Filter	OIL-X Filter Grade OVR Adsorption Filter	OIL-X Filter Grade AO(M) General Purpose Dry Particulate Filter	OIL-X Filter Grade AO(M) High Efficiency Dry Particulate Filter
FBP HL 100-170	Included	Included	Included	Included	Included	Included
FBP LE 100-170	Included	Included	Included	Included	Included	Included

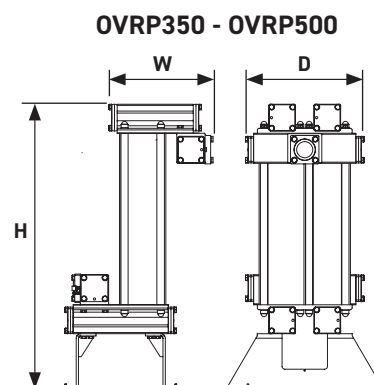
Weights and Dimensions - Included Filtration (All FBP 100-170 models)

Filter Model	Filter Connections BSPP	Height (H)		Width (W)		Depth (D)		Weight	
		mm	ins	mm	ins	mm	ins	kg	lbs
040H	2"	532	20.94	164	6.46	157	6.18	7.18	15.82
045I	2½"	532	20.94	164	6.46	157	6.18	7.18	15.82
050I	2½"	654	25.75	192	7.56	183	7.20	10.18	22.43
055J	3"	844	33.23	192	7.56	183	7.20	15.78	34.78



Weights and Dimensions - Included OVR (All FBP 100-170 models)

Filter Model	Filter Connections BSPP	Height (H)		Width (W)		Depth (D)		Weight	
		mm	ins	mm	ins	mm	ins	kg	lbs
OVRP350H	2"	1062	41.8	538	21.2	550	21.7	67	147
OVRP400H	2"	1062	41.8	682	26.9	550	21.7	93	205
OVRP400I	2½"	1062	41.8	682	26.9	550	21.7	93	205
OVRP450I	2½"	1062	41.8	836	32.9	550	21.7	121	267
OVRP500J	3"	1062	41.8	1005	39.6	550	21.7	144	318



Example Installation: FBP HL 130



Example Installation: FBP LE 170



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