PEAK GAS GENERATION

Your local **gas generation** partner

i-Flow O2 Gas Generators

Product Training

A PEAK gas generation brand

PEAK Gas Generation – 02

i-Flow O2

Oxygen Gas generator

- **Oxygen gas, on-demand – 6 models, capable of supplying up to 480 L/min, at purities ranging from 90 – 94%**
- **Modular expandability** - future-proof design, allows columns & generator units to be added as business needs grows
- **Cost effective** - Cost effective & reliable industrial grade oxygen, available on-demand
- **Verified Purity** - Independently verified oxygen purity (via the National Physical Laboratory)
- **Quality guaranteed** - Quality guaranteed with built-in PurityGuard™ gas monitoring & application safeguard system
- **Energy Efficient** - Energy efficient with built in standby mode, ensuring the lowest running costs
- **Safer supply** - On-site safety, eliminate the risks of high-pressured gas cylinders or cryogenic liquid storage tanks
- **Eco-friendly** - Lower carbon footprint & environmentally friendly

i-Flow O2 8000 Series: Capability & Performance

Model	801X	802X	803X	804X	805X	806X
O2 Purity	Flow Rate (L/min)					
94%	**70**	140	200	260	320	380
93%	80	160	230	310	375	440
90%	90	180	240	320	400	**480**
Max. Pressure	5 bar					

NOTE:

Performance Data is based on standard requirement of 7 bar inlet pressure.

Inlet temperature assumed & 20-25 degrees C

i-Flow Gas Generators: Future-Proof, Modular Design

Expandable:

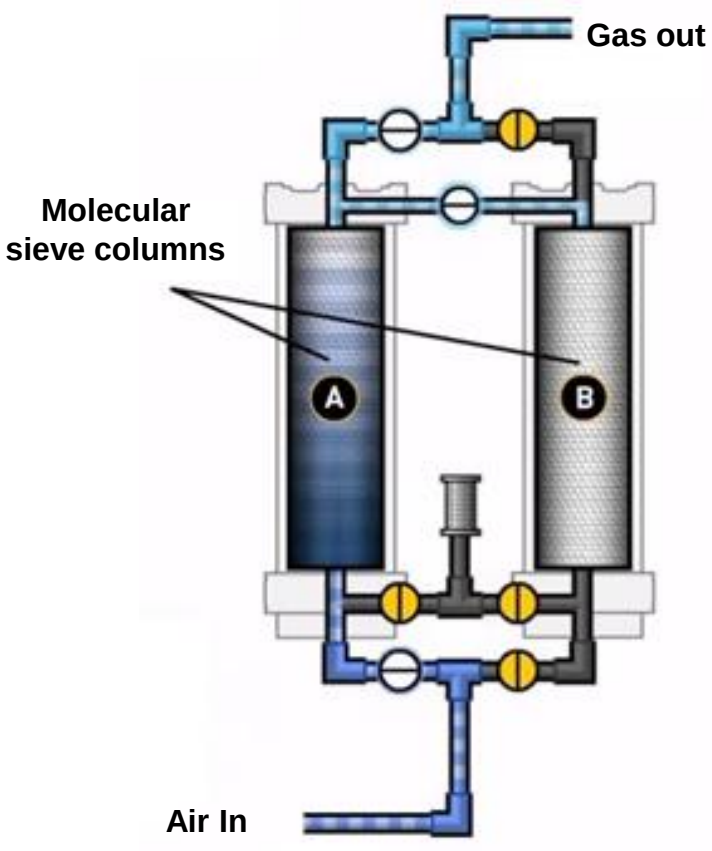
Additional column banks can be added on-site to any unit retrospectively as demand grows

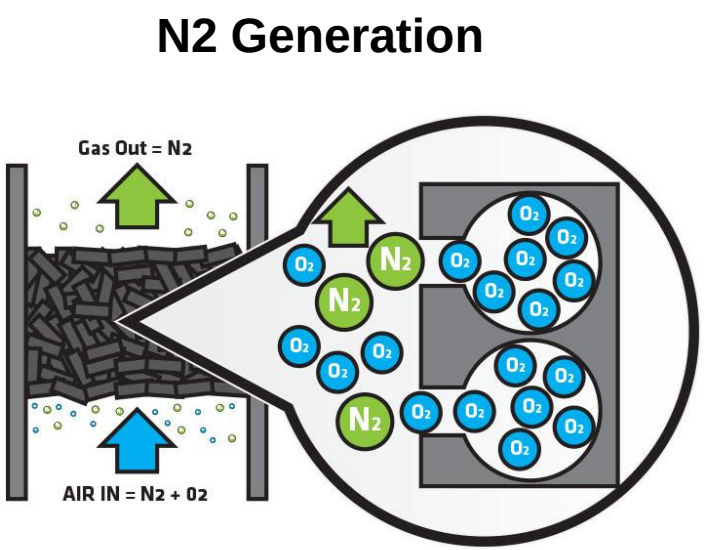
Scalable:

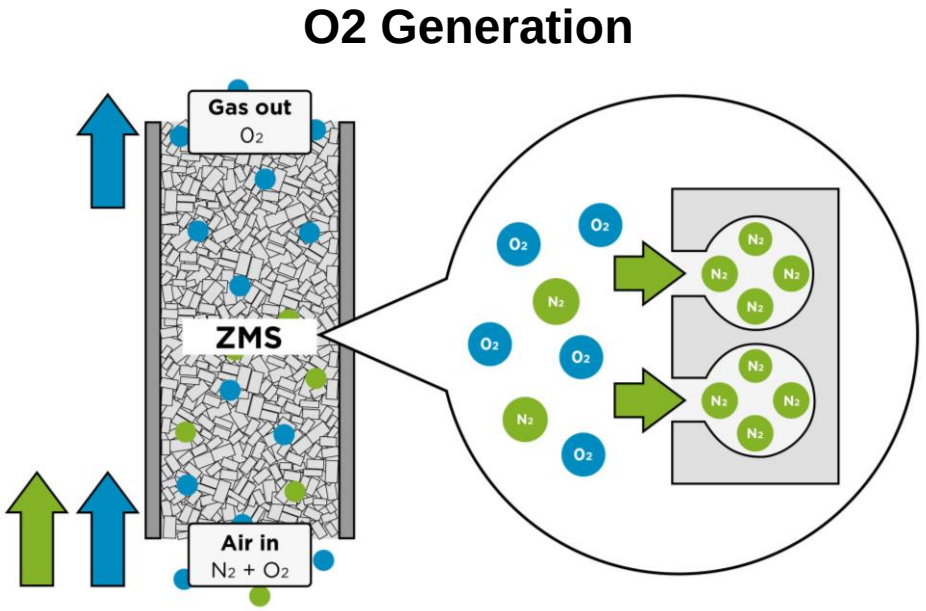
i-Flow's modular design also allows for several units to be synchronized together to further scale up output capacity

Product Overview:Technology

Technology: Pressure Swing Adsorption







i-Flow N2 & O2 gas generators use a process called **Pressure Swing Adsorption** (PSA), which utilises a **Molecular Sieve** (N2=Carbon, O2=Zeolite). Under cyclical pressurisation, the molecular sieves preferentially adsorb gases, allowing the product gas (N2 or O2) to pass downstream, as adsorbed gases are vented safely to atmosphere.

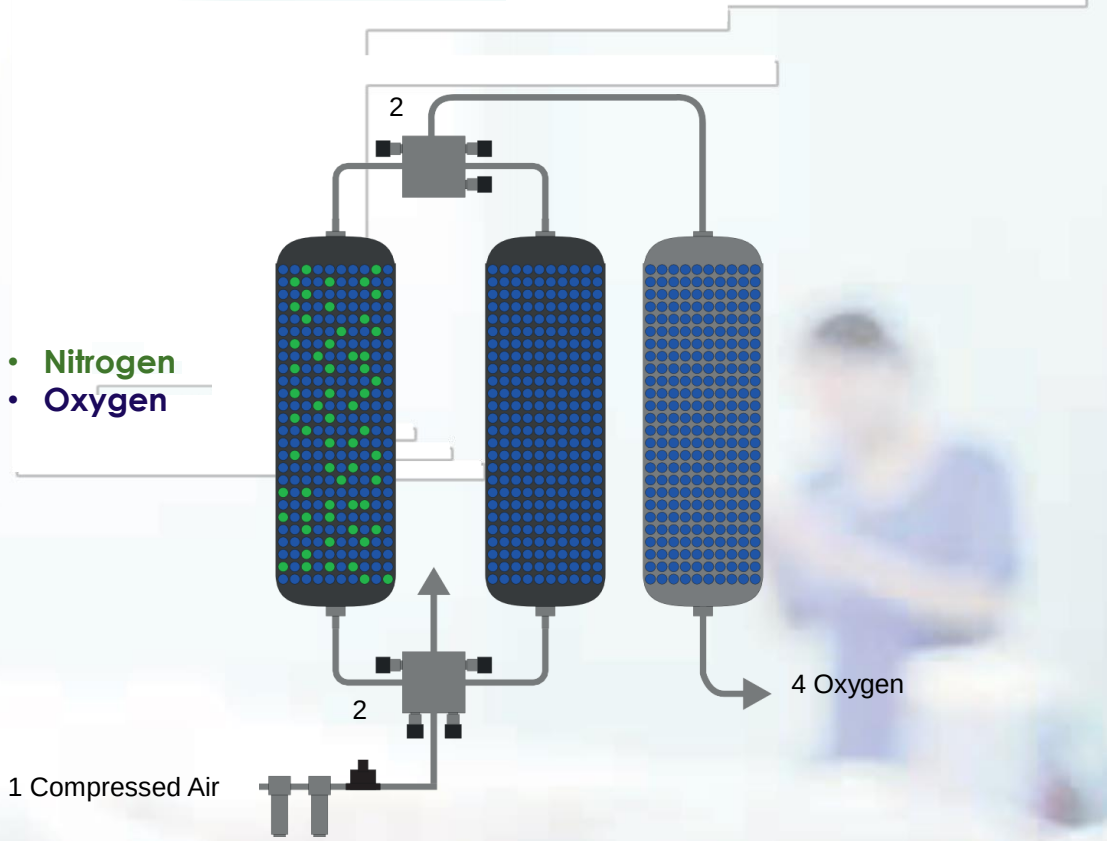
PSA

i-Flow O2 8000 series oxygen generator

i-Flow O2 is a modular & expandable Pressure Swing Adsorption oxygen gas generator, utilizing synthetic zeolite molecular sieve purification technology to supply high quality, industrial grade oxygen, at up to 480 L/min, at up to 5 bar pressure and a consistent purity.

Oxygen generation using PSA

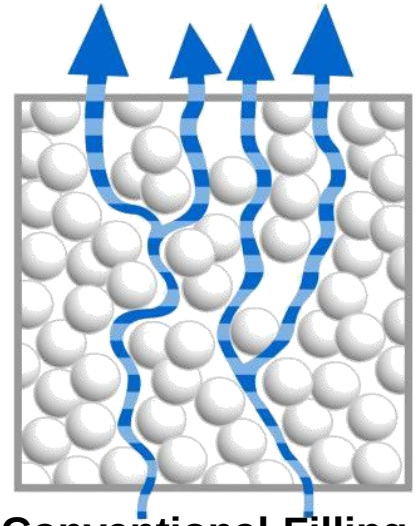
1. Filtration
2. Control Valves
3. Synthetic Zeolite
4. Oxygen output for use Nitrogen Oxygen



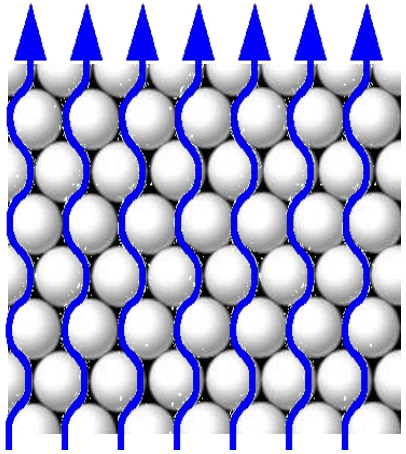
Technology: Carbon & Zeolite Molecular Sieve

Consistent, efficient & robust:

- High quality grade CMS / ZMS – lifespan 10 to 20 years!!
- *'Snowstorm filling'* technique allows for a greater quantity of pellets to be compacted into the bed (approx. 16 – 18% more)
    - Prevents *'channelling'* - ensures consistent performance & purity
    - Prevents abrasive breakdown due to cyclical pressurisation / depressurisation

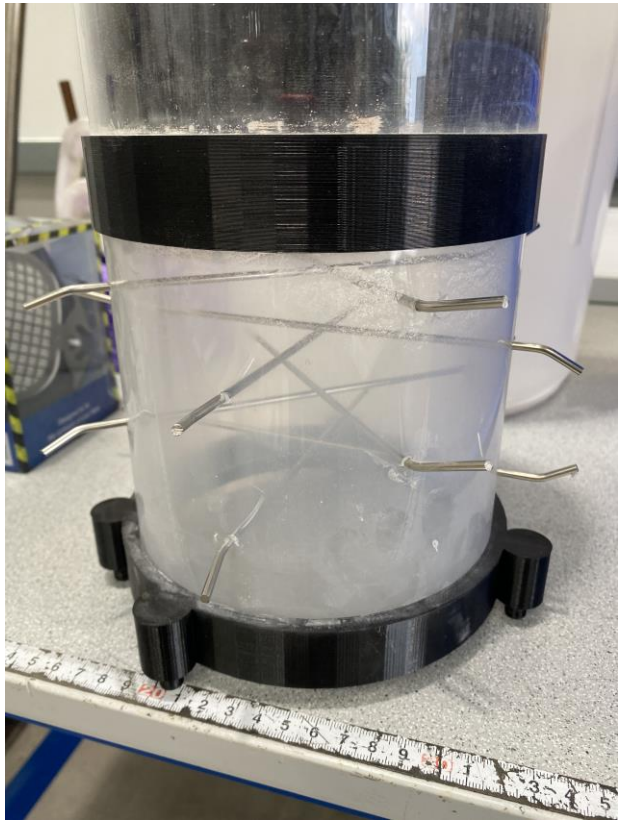


Conventional Filling



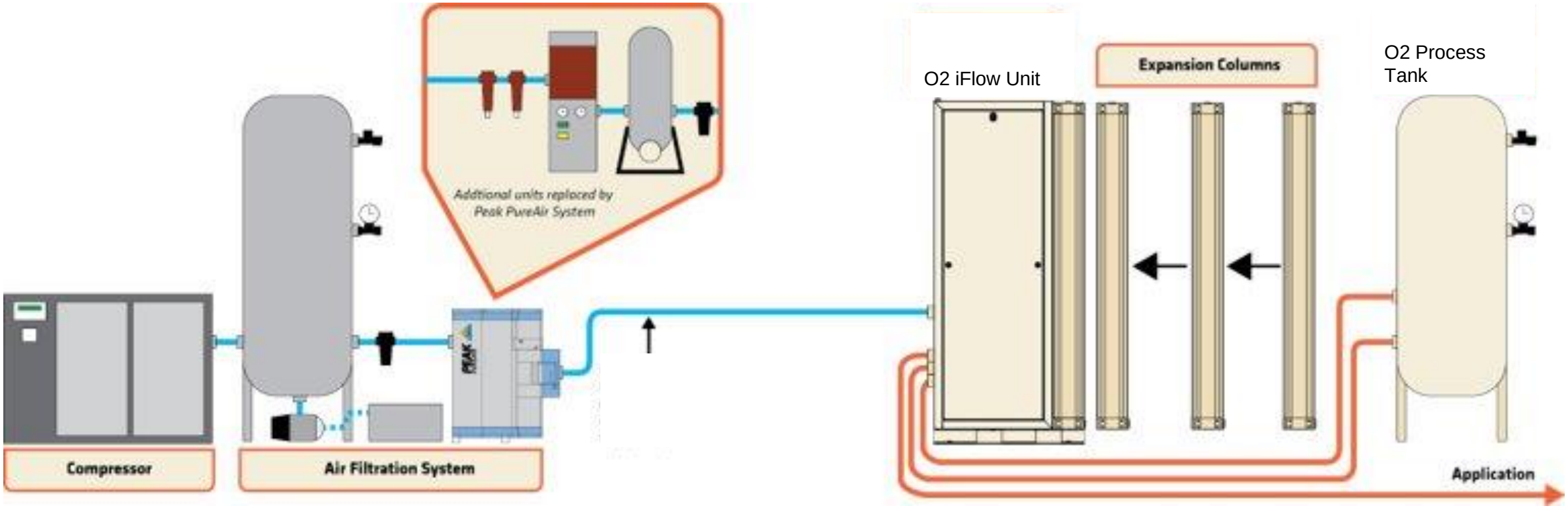
Snowstorm Filling

Snowstorm Filling



Product Overview: Typical Set-up

Installation



Minimum Air Quality ISO 8573-1:2010 class 1.4.1

Minimum Inlet Air Pressure 87 psi (6bar)

Maximum Inlet Air Pressure 145 psi (10bar)

Minimum Inlet Air Temperature +5°C (41°F)

Maximum Inlet Air Temperature +35°C (95°F)

PEAK GAS GENERATION

ISO 8573-1:2010 Compressed Air Contaminants and Purity Classes

Class	Particles				Water			Oil
	By Particle Size (maximum number of particles per m^3) See Note 2			By Mass	Vapor Pressure Dewpoint		Liquid	Liquid, Aerosol, & Vapor See Note 1
	0.10 – 0.5 microns	0.5 – 1.0 microns	1.0 – 5.0 microns	mg/m^3	°C	°F	g/m^3	mg/m^3
0	As specified by the equipment user or supplier and more stringent than class 1							
1	≤ 20,000	≤ 400	≤ 10	-	≤ -70	≤ -94	-	≤ 0.01
2	≤ 400,000	≤ 6,000	≤ 100	-	≤ -40	≤ -40	-	≤ 0.1
3	-	≤ 90,000	≤ 1,000	-	≤ -20	≤ - 4	-	≤ 1
4	-	-	≤ 10,000	-	≤ +3	≤ +37	-	≤ 5
5	-	-	≤ 100,000	-	≤ +7	≤ +45	-	-
6	-	-	-	0 – ≤ 5	≤ +10	≤ +50	-	-
7	-	-	-	5 – ≤ 10	-	-	≤ 0.5	-
8	-	-	-	-	-	-	≤ 5	-
9	-	-	-	-	-	-	≤ 10	-
X	-	-	-	> 10	-	-	> 10	> 5

Microbiological Contaminants	Other Gaseous Contaminants
No purity classes are identified	No purity classes are identified Gases mentioned are: CO, CO_2, SO_2, NOX, Hydrocarbons in the range of C_1 to C_5

Product Overview: Safety

Overview

Although input and output pressures may not differ greatly from most of our Scientific range, it is the flows involved in the industrial process that add greater risk to safety

At many points in the system there can potentially be thousands of L/pm at any given time, therefore ensuring we are operating safely becomes even more critical

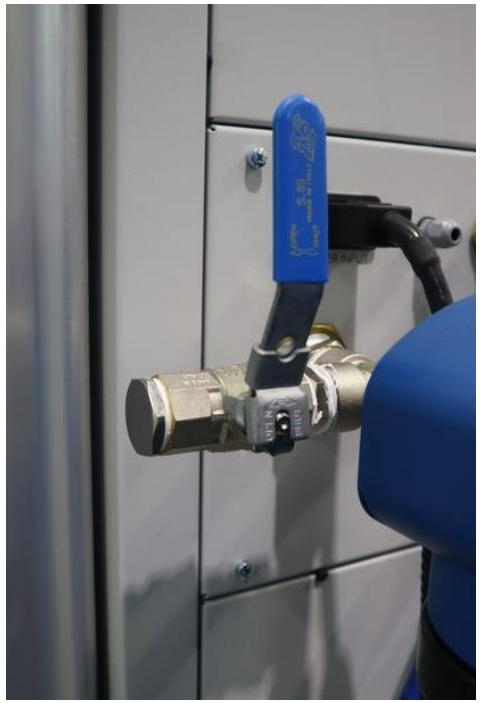
How do we achieve safety?

Training

Building on prior knowledge and experience to have a greater understanding of how the system works and how to remain safe

PPE

Meeting the minimum required standard to ensure we remain protected at all times



Points of Isolation

Know of all the points of isolation throughout the system, both electrical and pneumatic. This allows us to correctly isolate areas we are working on.

Being aware of the dangers around us and adhering to approved procedures, as well as referring to service manuals can help keep us safe.

Product Overview: Why is Maintenance is Important

Front face of generator

Service Counter

The service LED will indicate when the annual service is due.

Once illuminated the generator will continue to function as normal but should not be operated for prolonged periods of time without carrying out the required maintenance.

Why Maintenance is Important

- N2 and O2 Service
- Skidded Solution

Safety Notice

Always ensure the system is isolated/dissipated correctly and safe to work on

Always follow the safe isolation procedure, if you are unsure…

Service Schedule

Due to the simplicity of the design and the small number of moving parts the Industrial i-Flow Series O2 & Nitrogen Generators will have a long and trouble-free life. However as with all scientific and technical equipment it should be regularly inspected and serviced as below.

Service Interval	Component
12 months	Vent Silencer Element
	Pneumatic Valve Exhaust Silencer
	N_2 Supply NRV
24 months	O_2 Analyser % (#)
48 months	O_2 Analyser PPM (#)

Note # - Analyser service is dependent on s

Vent Silencer Element

The Pressure Swing Adsorption Cycle is crucial to the performance of the generator & maintaining the purity of gas produced.

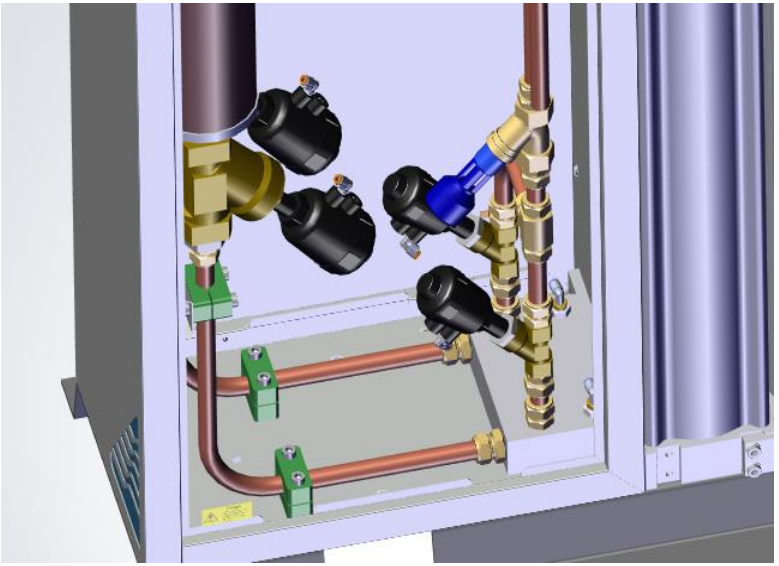
Carried out annually

Located inside the generator.

As we vent high volumes of N2 from the generator the silencers are there to reduce the noise.

Reason for changing annually.
Any blockage in the silencer will slowdown the venting process this will have a direct affect the purity of the O2

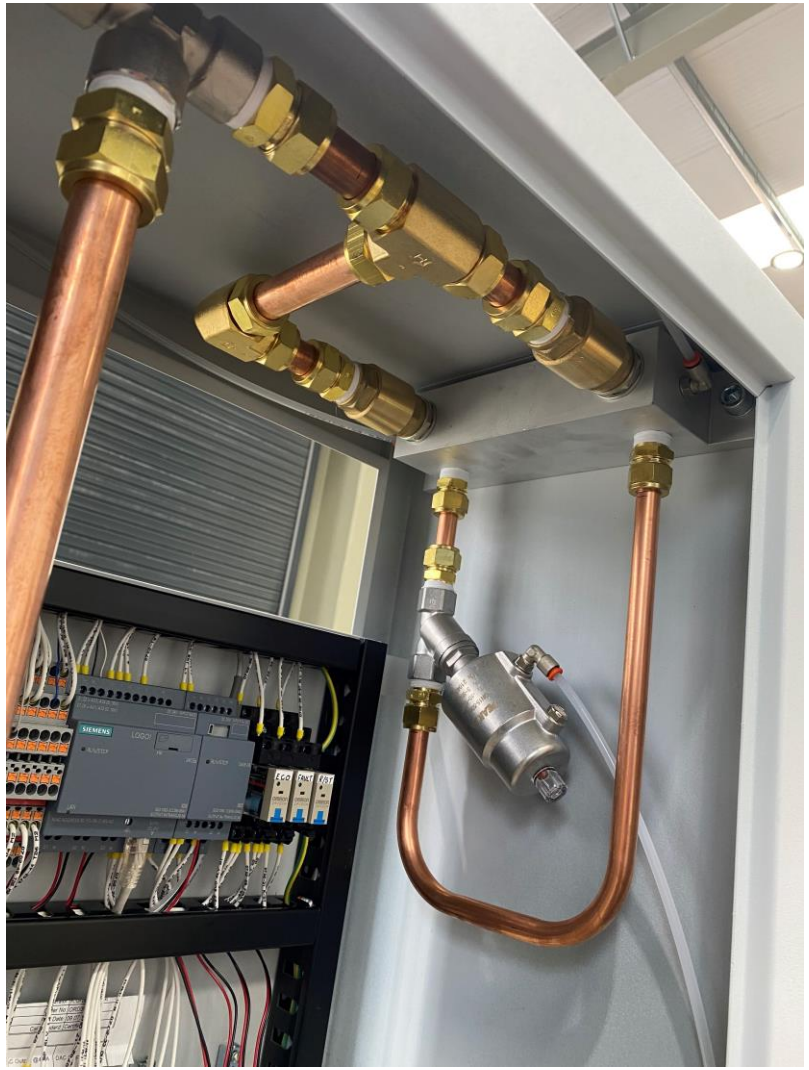
Pneumatic Valve Exhaust Silencer



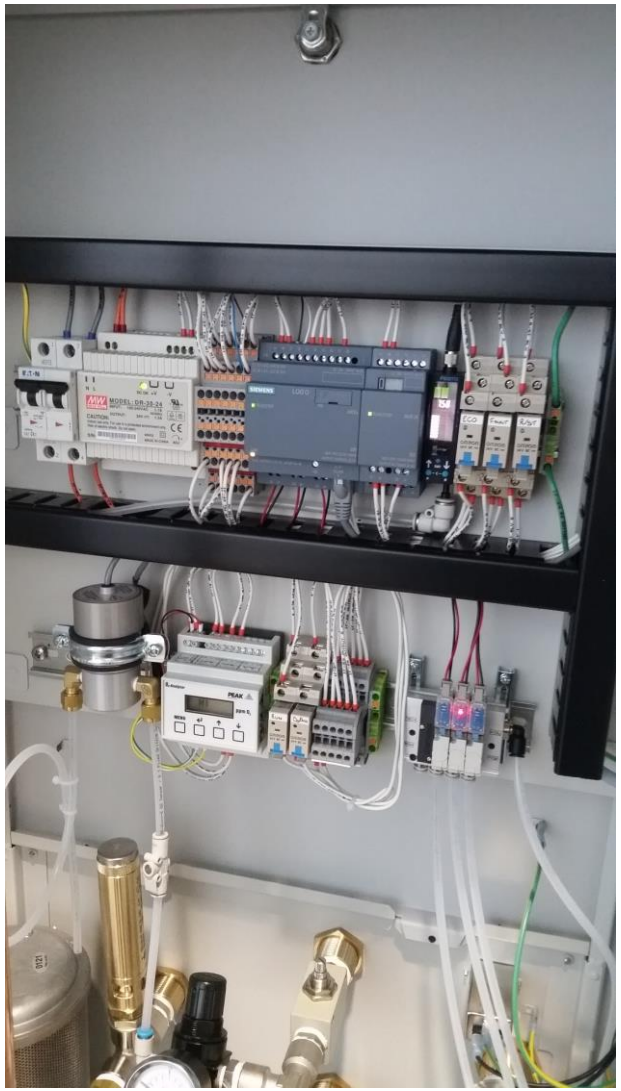
Changed Annually
Timings are critical to the operation of the PSA system even a delay of seconds due to any blockage will affect the purity.

N2/O2 Supply NRV

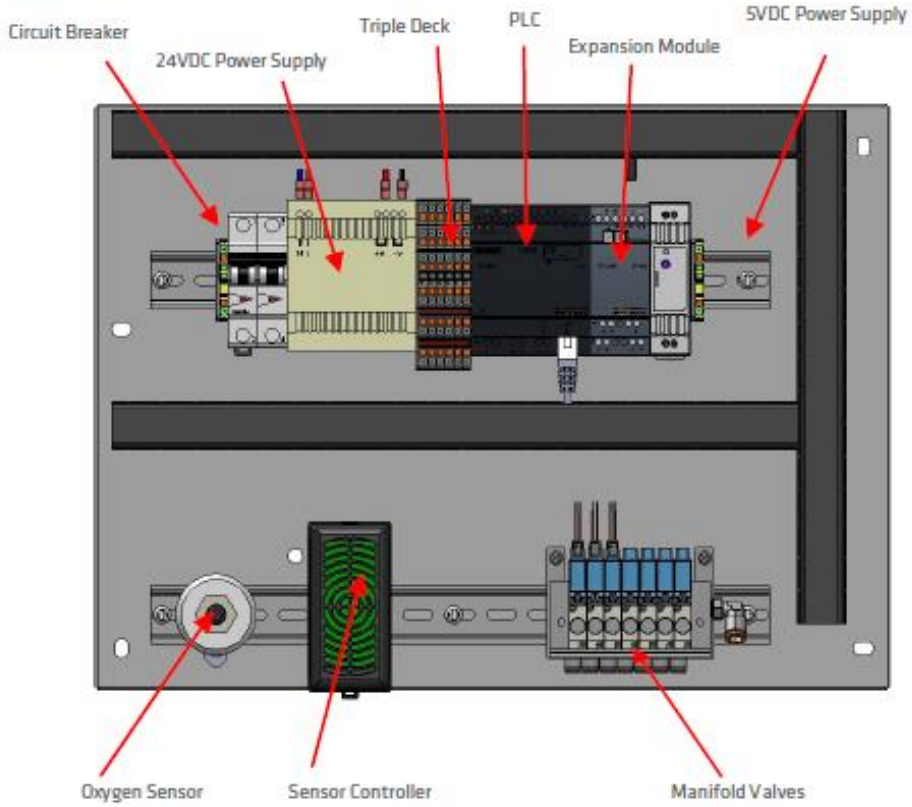
The NRV’s prevent back flow of the produced O2 gas to the offline column during the vent process. These are changed annually as the seal can degrade over time



O2 Analyser

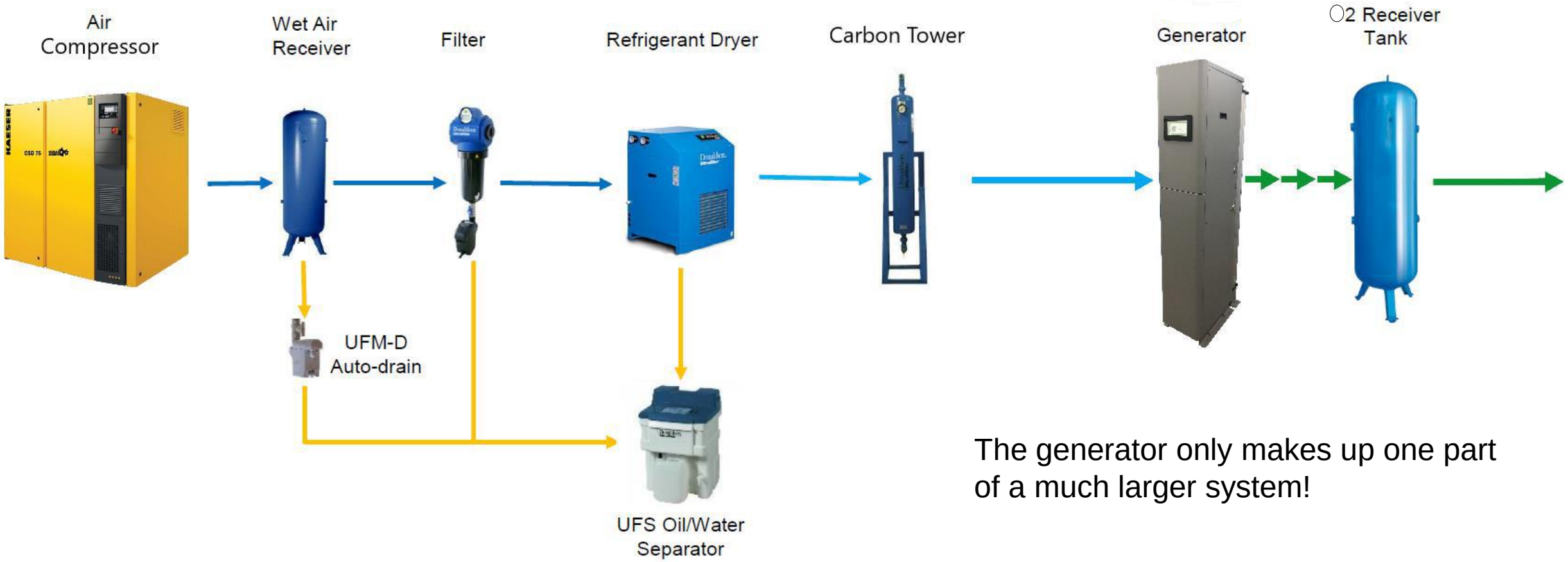


O2 analysers are customer selected options, it may be that you have selected not to fit an analyser as gas quality is not critical to your operation.



Troubleshooting

Full System Set Up



The generator only makes up one part of a much larger system!

Compressor Faults

A good starting point for any faults compressor side is to check it has been serviced in accordance with recommendations!

A very common fault is a trip on High Temperature. This is normally due to a low oil level/fault with the oil system (again, leading us back to servicing) but can also be caused by running at max capacity for sustained periods of time due to leaks or the generator requiring too much air (incorrect set up – check generator settings)

Dryer Faults

Like the compressor, always check dryers have been regularly serviced correctly!

If installed in A poorly ventilated room the dryer may also trip on high temperature. Also if the filters/auto drain develop a fault or block due to not being serviced, they may create a large pressure drop in the system which will choke the downstream appliances (our generators)

Contamination Due to Air Filtration Failure

PSA gas generators require a certain quality of air which must be maintained with regard to Particle, Water and Oils (Air compressor condensate) other-wise the column media (Zeolite) will become contaminated and lose performance with no chance of recovery.

We have filters both inside the generator and on the input side to ensure the correct air quality is met prior to reaching the PSA system. Check the condition of filter elements in the event of system contamination.

Input Pressure Not Correct

1. Check Valve line-up correct (vent/drain valves shut, system isolation valves open)

Click for Image

2. Check that all inlet filters have been serviced correctly and filter elements and auto-drains are not blocked/full

Click for Image

3. Check all inlet air pipework fittings and components are leak free and securely fastened

Click for Image

4. Check Inlet air vent valve before generator inlet is securely closed.

Click for Image

5. Check i-Flow inlet pressure regulator has been set correctly as detailed on test sheet

Click for Image

6. Check inlet Flow control Orifice not blocked

Click for Image

Outlet Pressure and Flow not correct

1. Correct Flow using generator outlet flow controller to flow stated on test sheet

Click for Image

2. Correct Pressure using generator outlet pressure controller to pressure stated on test sheet

Click for Image

3. Check input pressure is correct with test sheet

Click for Image

4. Check for system leaks on generator and outlet pipework fittings/valves

Click for Image

5. Close off outlet and check generator enters ‘Eco Mode’, once in Eco Mode process tank pressure should stabilize, if not replace Non-return valves.

Click for Image

Purity Not Correct Or Spiking Rapidly

1.Has generator had enough time to reach purity from startup (24 hours)

2.Check Oxygen sensor and analyzer are within calibration date (certificate inside generator)

Click for Image

3.Check analyzer and PLC have the same reading

Click for Image

4.Check system for leaks

Click for Image

5.Check flows and pressures are correct

Click for Image

6.Check that reduction valve for analyzer sensor is set around 4 bar

Click for Image

7. Check SMC Solenoid valves are securely attached to manifold on Electrical panel (2 very small screws on each solenoid valve may require tightening)

Click for Image

8. Check Carbon tower ‘Saturation’ gauge at bottom of carbon tower, if high/top level replace carbon

Click for Image

Thank you
www.peakscientific.com

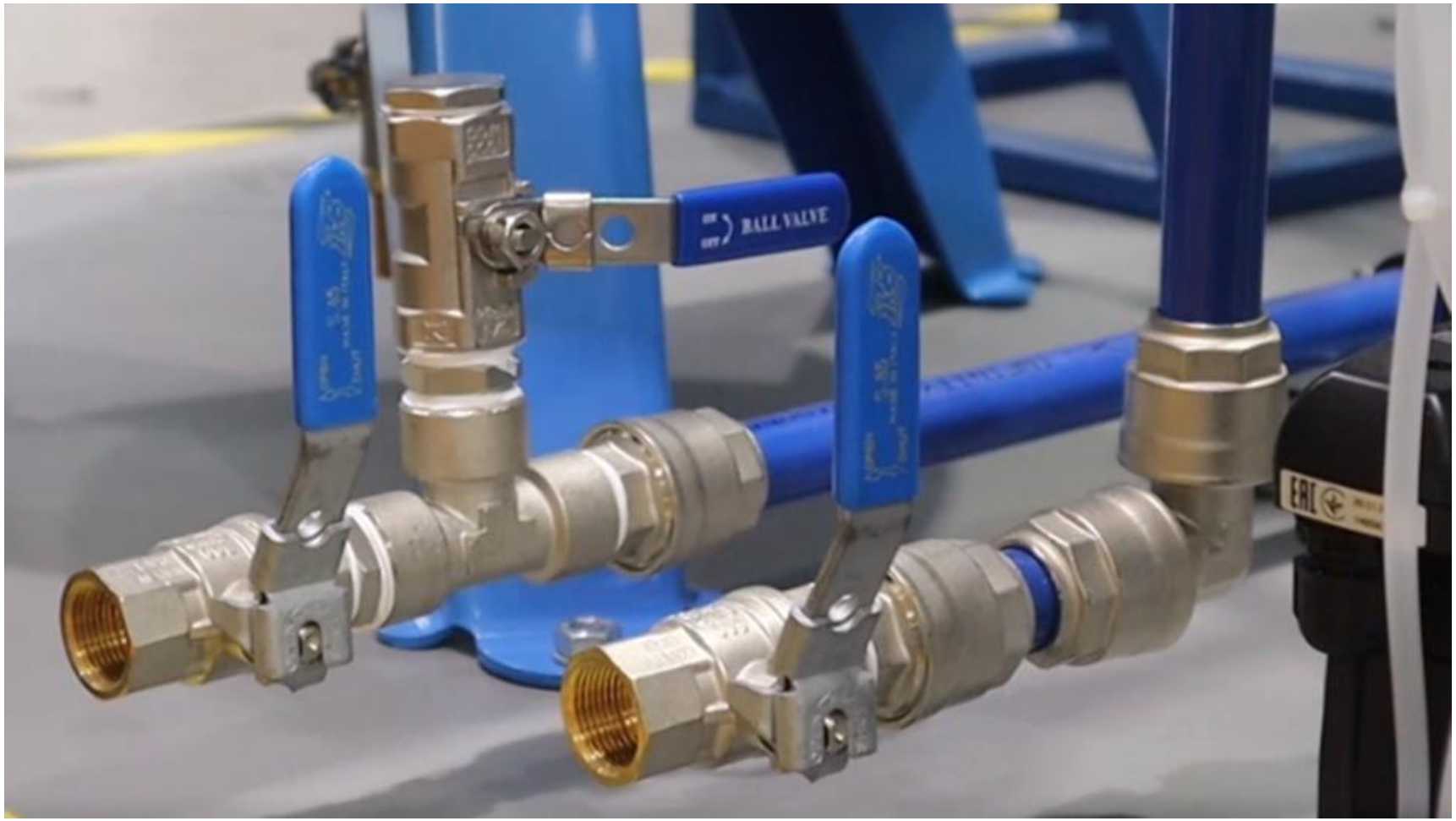
Our Vision:

To exceed the expectation of our Customers, Colleagues and Suppliers

Our Values:

- **Respect** customer, supplier, colleague
- **Restless** constantly striving to improve
- **Freedom with responsibility**
- **Fun & passion** in everything we do

Back




Donaldson
Ultrafilter


PEAK


EN 837-1
bar
psi
CL 2.5
PEAK


PEAK

IFLOW Generator Test Sheets

Production QA Report

Model		MRO Number	
Voltage		Serial Number	
Customer		Invoice Ref	
Hertz: 50/60	Amps: 2.0-1.0	Minimum Air Supply: 1260 l/min	BC Number
Inlet Pressure: 7.5 bar	Outlet Pressure: 6.5 bar	O2 Content: 0.38%	Outlet Flow: 450 l/min	2797

Build Data

CMS Column Fill Data (mm)	Depth at Fill	Depth after test	CMS Lot No.
CL - 1 - 2			190412515
CL - 3 - 4			190412515
CL - 5 - 6			190412516
CL - 7 - 8			
CL - 9 - 10			
CL - 11 - 12			
CL - 13 - 14			
CL - 15 - 16			
CL - 17 - 18			
CL - 19 - 20			

PLC Data		Software Version: V1.612		Pressure Switch Settings
Cycle Time	42 Sec	BYPASS_OVRIDE	ON/OFF	UNI
RF_START_EN		OP.DV.VALVE-EN	ON/OFF	oU1
START_TIMER		OP.DV.PASS-EN	ON/OFF	1ot
TEST_ECO LED	✓	ANALYSER-NIL	ON/OFF	H_1
TEST_BER LED	✓	ANALYSER-PPM	ON/OFF	H_1
RGEN_INTERVAL	hrs	ANALYSER-%	ON/OFF	oU2
RGEN_BLOCK	Mins	SHUT-BLOCK	ON/OFF	2ot
BYPASS_TIMER	Mins	DRY FAULT-EN	ON/OFF	P_2
ECO_DELAY	Mins	INTR.OPAC_M	ON/OFF	H_2
ECO_BLOCK		ALARM_ACK_DN	ON/OFF	
E_HRS-RESET	hrs			

Setup Data

Inlet Pressure		barg
Inlet Orifice		mm
Column Orifice		mm
Gas Orifice		mm
Outlet Pressure		barg
Outlet Flow		l/min
BypPass Flow		l/min
Leak Free		
Sign:	Print:	

Optional Oxygen Analyser (If Fitted)

Parameter	Value
E2	
E3	
E4	
E17 - R1	
E17 - R2	
E18 - A1	
E18 - A2	
E19	

Date: 5/12/19 | Visual Inspection

Bolts, Eyebolts & Plugs

M12 x 70	2883755 DM
M12 x 60	2879880 D3
M10 x 35	7146157 (OK)
Plug 0.1"	P626106
Plug 0.3/8"	18F02325
M16 Eyebolt 1	A2
M16 Eyebolt 2	A2

Test Data

Test Room Conditions	Temp °C	Humidity %	
O2 Content			
Evaporator (optional)			
Di-Electric Test	1.52		
Earth Bond	0.01		
Conversion Ratios		Conversion Number	
Output gas flow and pressure per			
Sign:	Print:		

Final Visual Insp	
Insulation Test	
Leak Free	

Oxygen Analyser Equipment

Analyser Serial No	P25991
Sensor Serial No	413094
Safety Valve Serial No	4579 4431
Flow Meter Serial No	PF415 7501
Pat Tester Serial No	526-020
Flash Test Serial No	025735093

Date: 06/12/19 | Visual Inspection

Despatch

ITEM	Checked	Comments
Visual Inspection (Cabinet & Sense Heads)		
Manuals, Plugs, Hex Key, Eyebolts		
Packing (Customer Address Labels)		
Labels (serial No - Counter Labels - Disposal)		
UPC Markings exist on Container		

Sign: | Print: | Date: | Visual Inspection

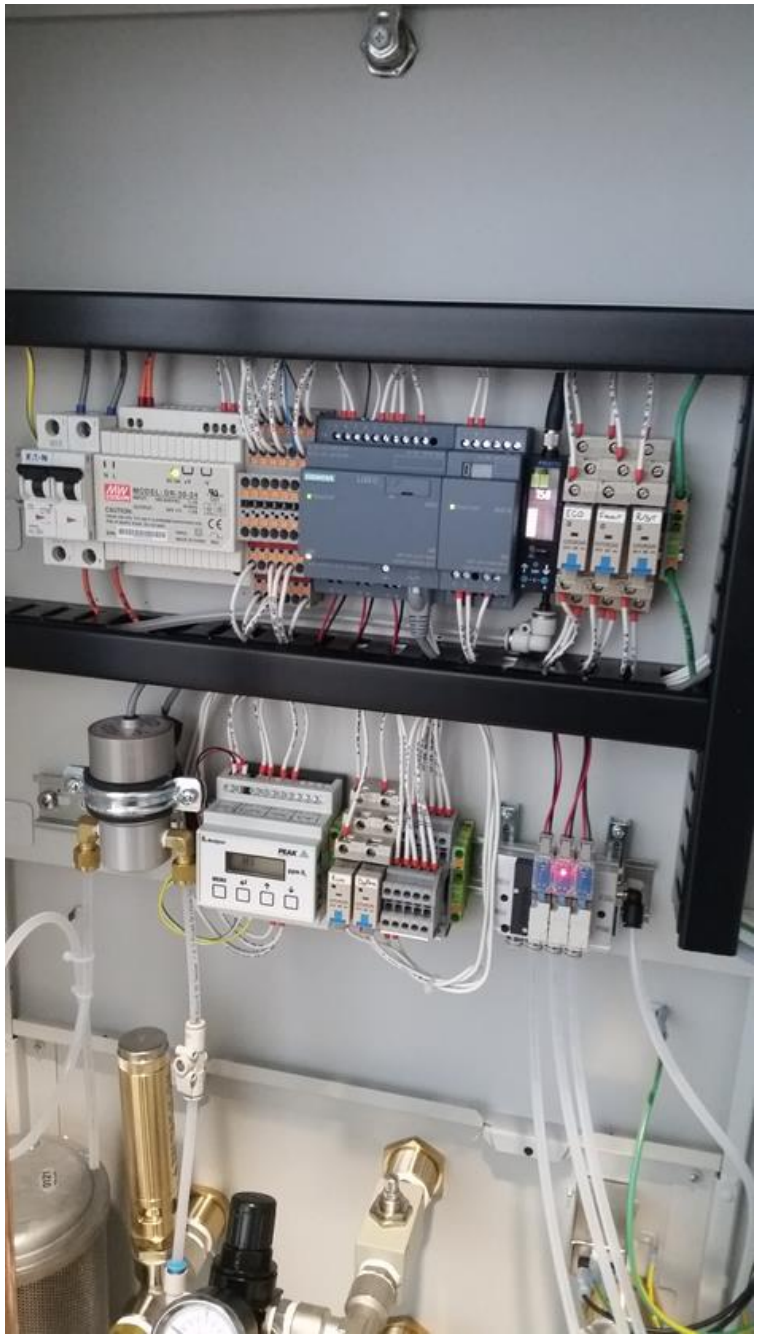
QA Checks

Build	PASS	Comment	
		Signed	Date: 06/12/2019
Test	PASS	Comment	
		Signed	Date: 06/12/2019
Quality		Comment	
		Signed	

RF-06 Rev.6 | Rev. Date 13/04/2018


ECO
mode


PEAK
INDUSTRIAL
SIEMENS
LOGO! TDE
PEAK 1-FLOW
COLUMN 1 ACTIVE
88 15m
OXYGEN CONTENT
+1000 ppm
F1
F2
F3
F4
ESC
ENTER
COLUMN 1
COLUMN 2
TANK PRESSURE
OUTLET PRESSURE
POWER
ECO MODE
SERVICE

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