



AFO9000/(-W) - Fully Integrated (High performance) Ozone supply system designed for Advanced semiconductor application: Uniquely configurable to optimize performance

▪ **AFO9000/(-W) COMPACT, INTERGRATED OZONE SUPPLY SYSTEM**

The AFO9000 System redefines ozone supply subsystems, providing a more compact, complete and integrated solution than ever before. The AFO9000 ozone supply system incorporates field-proven, high concentration, ultraclean ozone generation technology, an integrated ozone concentration monitor, flow control for both O₂ and dopant gas species. Designed for maximum configuration flexibility, AFO9000 stems match ozone value to your process requirements in the smallest, most complete delivery system available. In addition, the AFO9000-W type is hardware-configured to deliver the same performance as the AFO10000 series.

The AFO9000 System retains the compact size of 19" rack size ozone generators and includes not only ozone generation but concentration monitoring, flow control and pressure control. The AFO9000-W Generator is 250mm deeper than the AFO9000 series. The result- it is 40~ 60% more compact than competing ozone delivery systems. It is also the first ozone delivery system that can be designed directly into your tool structure or be integrated into a stand-alone AFS09 Series multi-channel ozone delivery system.

The Cell technology of AFO9000 is convert pure oxygen into ozone through silent electrical discharge and achieves the highest ozone concentration levels available, AFT ozone generators are the highest purity ultra-high concentration ozone generators on the market. The combination of generator design, high purity wetted materials and extremely minute levels of dopant gas (far below the levels required for competitive ozone generators), result in ultraclean ozone and the lowest levels of contaminants, e.g. NO_x compounds, available at ultra-high concentrations. The AFO9000, AFO9000-W series can operate *without the Dopant gas*.

▪ *Operation Principle*

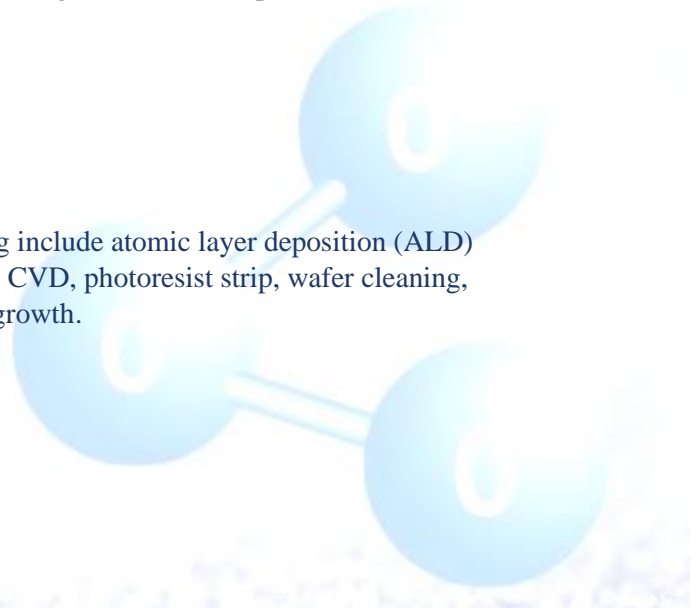
The ozone-generating cell may be represented as a capacitor with two electrodes. One is covered by a thin dielectric the other with a refractory metal. Oxygen flows between the electrodes and is converted to ozone. When electrical discharge occurs between electrodes, thermal, photochemical and electron effects form ions. Between the two electrodes free electrons present are accelerated by the action of the electric potential difference between the electrodes and the electric field. They form further ions by colliding with other atoms. When enough gas ions have formed in the space between the electrodes and a sufficient amount of electrical potential has accumulated on the electrodes, a barrier discharge is initiated. During the discharge, the gas becomes conductive and current starts to flow between the electrodes. The dielectric barrier prevents the formation of a single large plasma channel between the electrodes. Instead, a large number of smaller discharges uniformly distributed over the surface of the dielectric will form, each carrying a small amount of current that corresponds to the local displacement current in the dielectric. The surface of the dielectric contacting the oxygen has a very large resistance which prevents spreading of electrical discharges over its surface. The ozone produced as a result of oxygen ionization is then ducted to the application. The power board will be designed to take and power 14 oscillators to make future expansions possible.

▪ *Application*

Typical ozone applications in semiconductor processing include atomic layer deposition (ALD) TEOS/Ozone chemical vapor deposition (CVD), Ta₂O₅ CVD, photoresist strip, wafer cleaning, contaminant removal, surface conditioning, and oxide growth.

▪ *Features*

- All-in one type ozone generator
- Can operate with N₂ and without N₂
- Ozone cell loaded 1 to 14 maximum
- Ozone concentration up to 335 g/Nm³
- O₂ flow rate from 1 slm to 40 slm enables process flexibility
- Closed-loop operation for accurate process control
- High redox potential
- Can be generated at the point of use
- Green chemical, easily converted back to oxygen Low Cost of Ownership



- No chemical disposal costs

▪ *Specification 1*

Model: AFO9000

Max Cell loaded Q'ty: 8

Minimum Ozone output: see figure 1

Ozone Flow range: 1-20slm

Feed Gas

Oxygen:	Grade 6 or better O ₂
Nitrogen:	100ppm grade 5 or better N ₂

Cooling Water

Temperature:	17deg +/-,1deg
Filtration	100 microns
Quality	Resistivity \geq 50Kohm/cm

AC Power

VAC(+,-10%)	208VAC
Phase	3 phase
Amps	12A
Hz	50/60Hz

Dimensions(W x D x H) 480 X 410 X 266mm

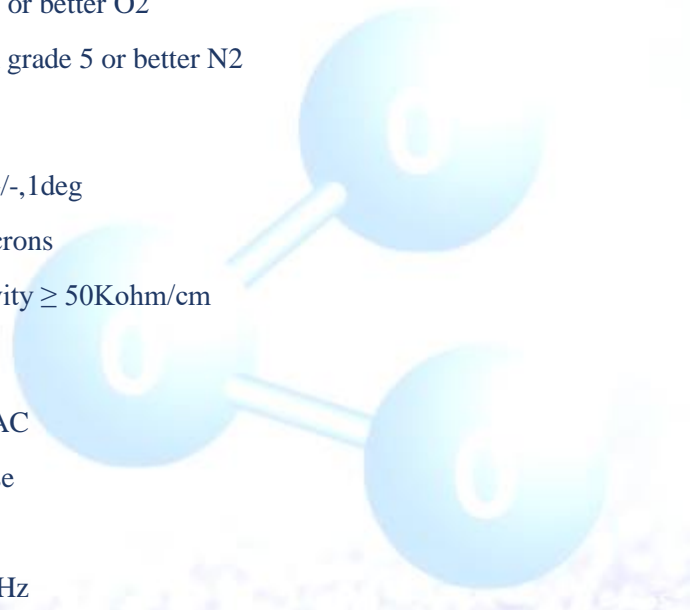
Compliance CE, SEMI S2

▪ *Specification 2*

Model: AFO9000-W

Mx cell loaded Q'ty: 14

Minimum Ozone output: see figure 1



Ozone Flow range 1-40slm

Feed Gas:

Oxygen: Grade 6 or better O2
 Nitrogen: 100ppm grade 5 or better N2

Cooling Water

Temperature: 17deg +/-,1deg
 Filtration 100 microns
 Quality Resistivity ≥ 50Kohm/cm

AC Power

VAC(+,-10%) 208VAC
 Phase 3 phase
 Amps 21A(14cell)
 Hz 50/60Hz

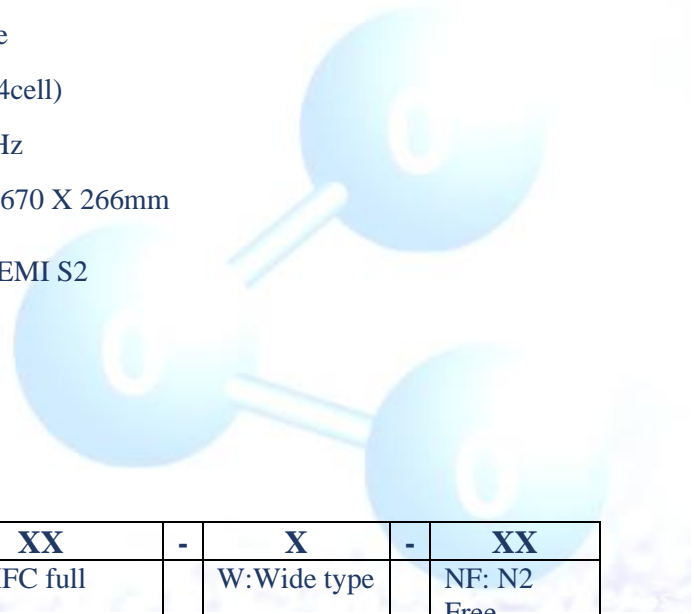
Dimensions(W x D x H) 480 X 670 X 266mm

Compliance CE, SEMI S2

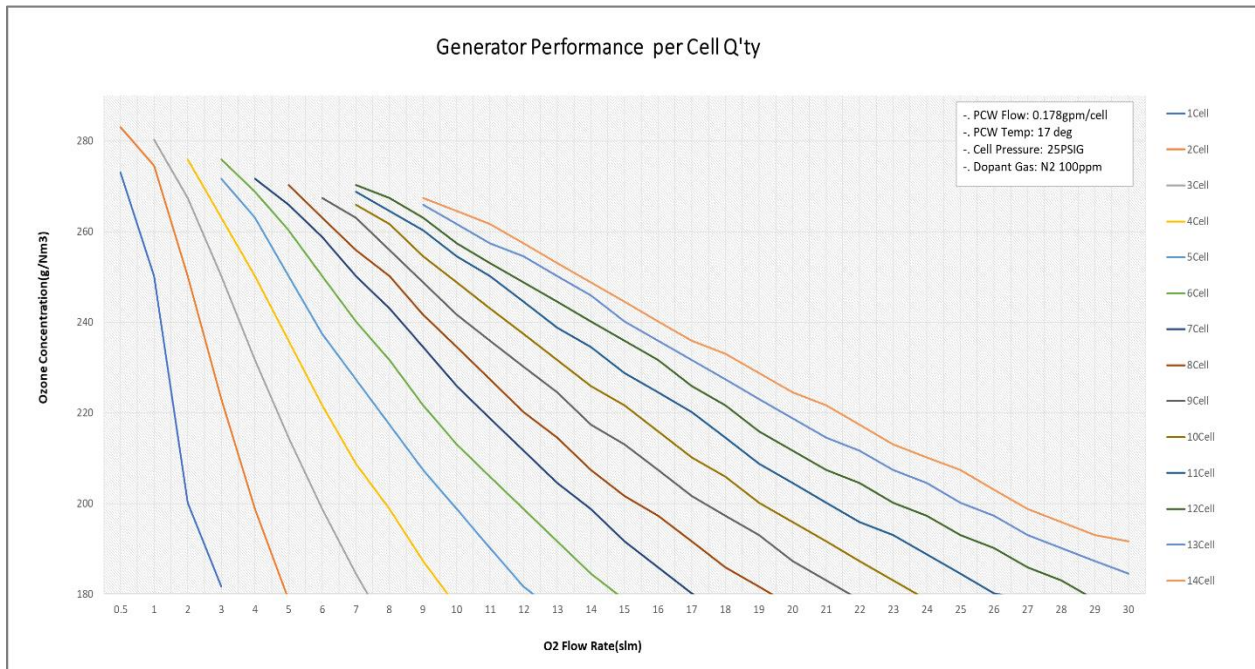
▪ ***Part number Matrix***

<Table 1, Generator part number Matrix>

AFO	09	XX	XX	-	X	-	XX
O3 GEN	9000 Series	Cell Q'ty	O2 MFC full scale		W:Wide type		NF: N2 Free
					0: Standard		0: N2 Use



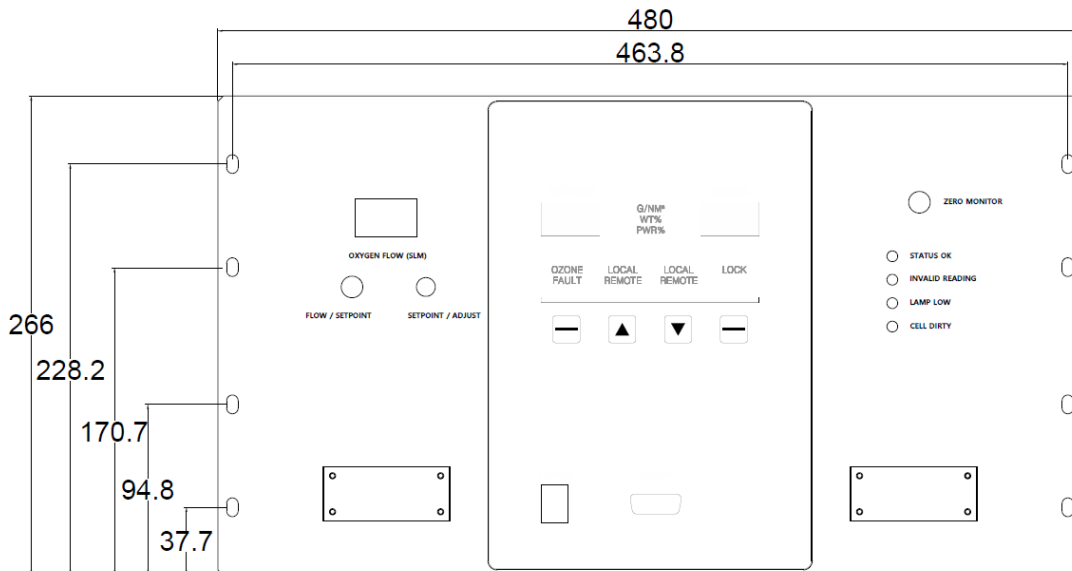
▪ **Performance**



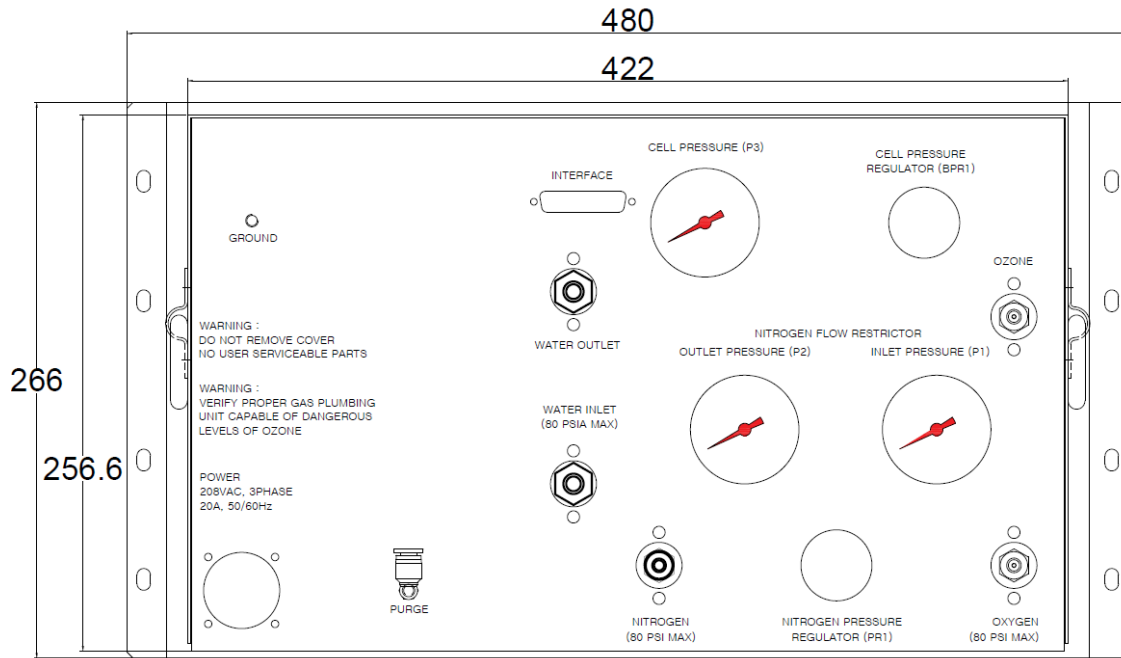
<Figure 1, Performance chart>

▪ **Dimension**

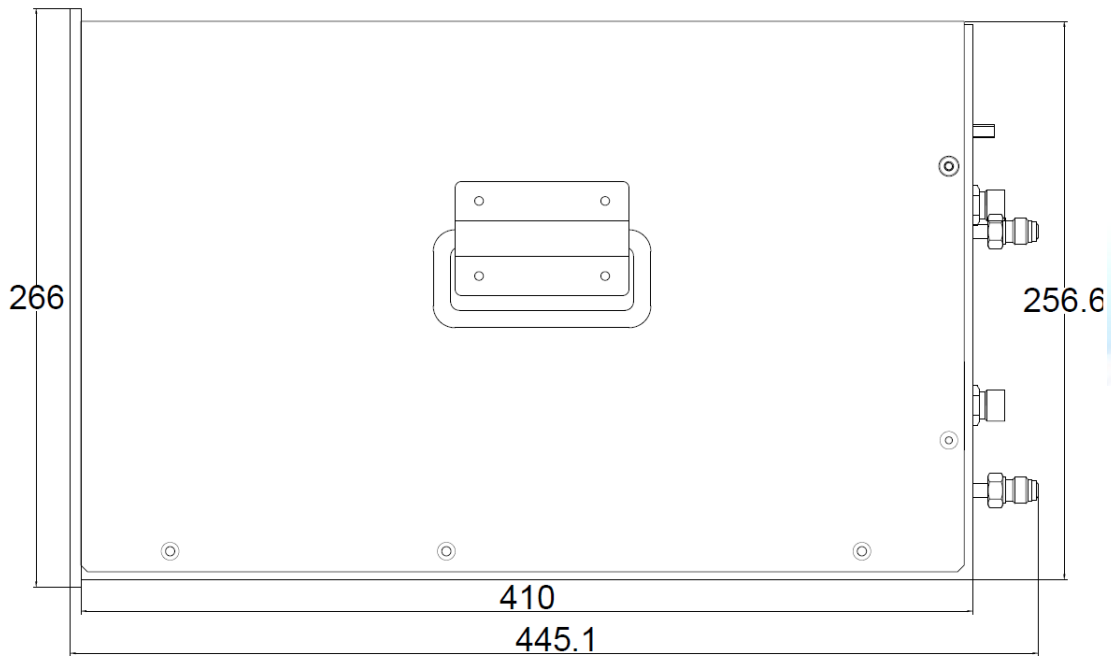
- . AFO9000 series



<Figure2, AFO9000 Front View>

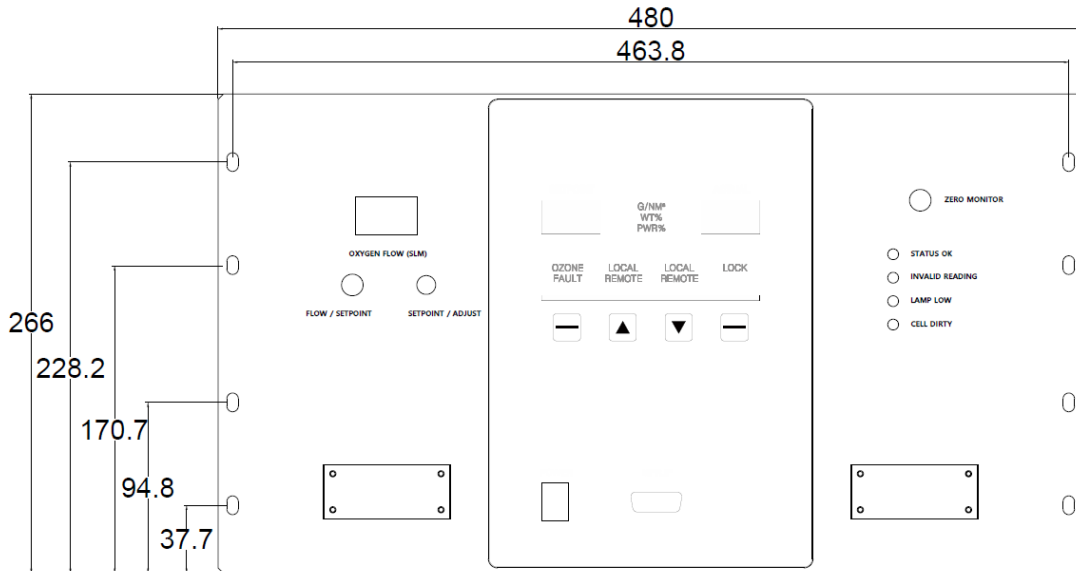


<Figure3, AFO9000 Rear view>

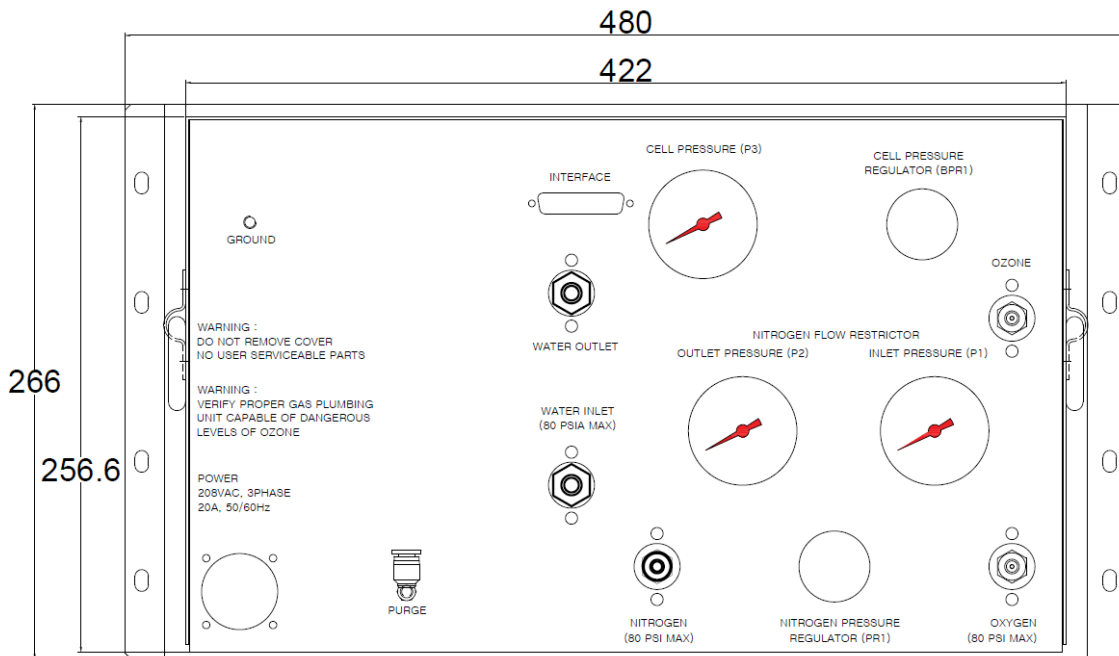


<Figure4, AFO9000 Side view>

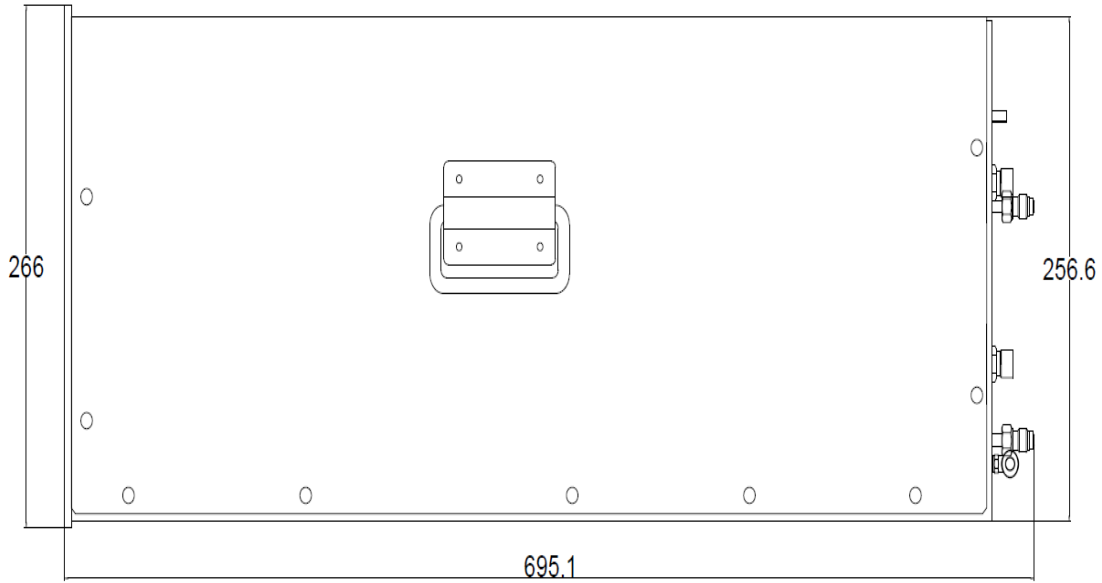
-. AFO9000-W



<Figure5, AFO9000-W Front View>



<Figure6, AFO9000-W Rear view>



<Figure7, AFO9000-W Side view>

