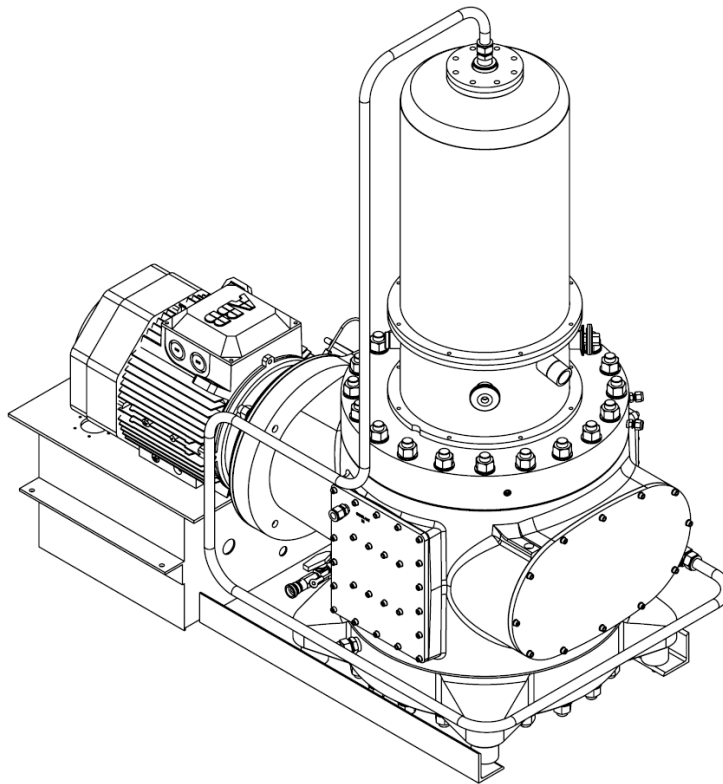


# Fabrum Solutions Pulse Tube Cryocooler

Model: Evercold PTC330

Product Description V.1.1

For safe and correct use, please read the operation manual thoroughly before operating the Cryogenic refrigerator.



Manufacturer:

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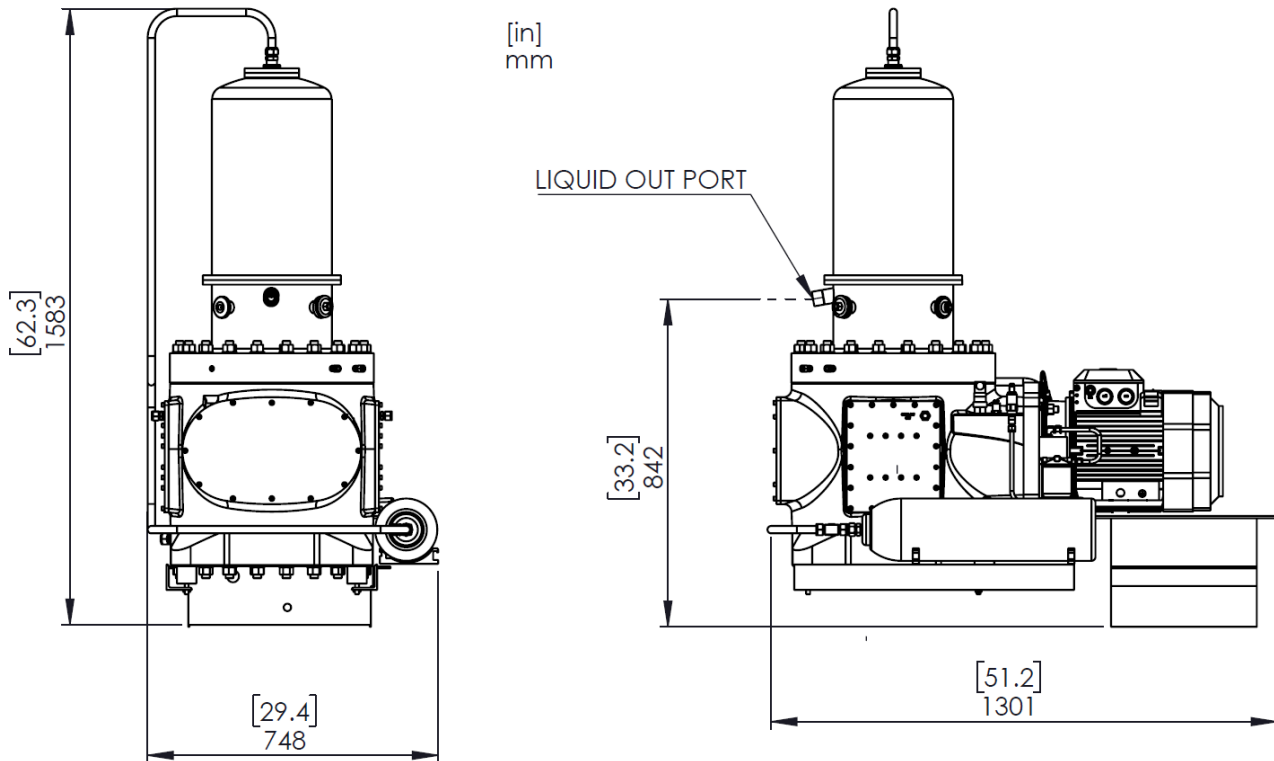
## 1. Technical Specification - Brief

<b>Model</b>	PTC330
<b>Swept volume</b>	330 cm <sup>3</sup>
<b>Power @ 77 K</b>	450 W
<b>No load temperature</b>	45 K
<b>Motor Power @ 77 K</b>	12 kW
<b>Weight</b>	635 kg
<b>Dimensions (m)</b>	1.3 (L) 0.75 (W) 1.6 (H)
<b>Noise at 3 m</b>	79 dBA
<b>Frequency</b>	50/60 Hz
<b>Current rating</b>	32 A

<b>Charge Pressure</b>	25 Bar
<b>Pressure amplitude</b>	5 Bar
<b>Ambient temperature</b>	0-35°C
<b>Heat rejection</b>	Water/Air
<b>Cooling water flow rate (In water-cooled configuration)</b>	15 l/min Approx. 3 Bar ΔP
<b>For closed loop air-cooled configuration</b>	
<b>Coolant pump power</b>	0.5 kW
<b>Radiator fan power</b>	0.42 kW
All specifications subject to change. Cooling power are given for water cooled configuration with 15°C water temperature. Dimensions and weights are for the cryocooler only.	

## 2. Geometry and Components

Figure 1 PTC1000 geometry



### 3. Condenser Layout

The condenser design depicted in Figure 2 has been optimised for use with a pressure swing adsorption unit feeding gas to the inlet port. In this configuration, a working dewar is used to collect the liquid, then transferred to storage dewars. The condenser is within the cryostat which is under static vacuum.

All wetted surfaces are austenitic stainless steel and copper which have good compatibility with LN2, LO2 and LNG.

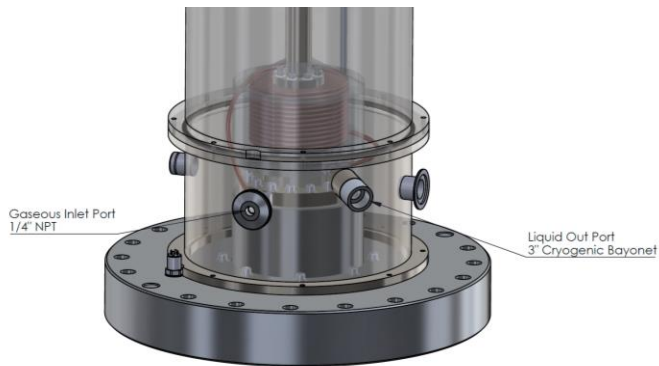


Figure 2 Condenser layout

### 4. Heat-lift Performance

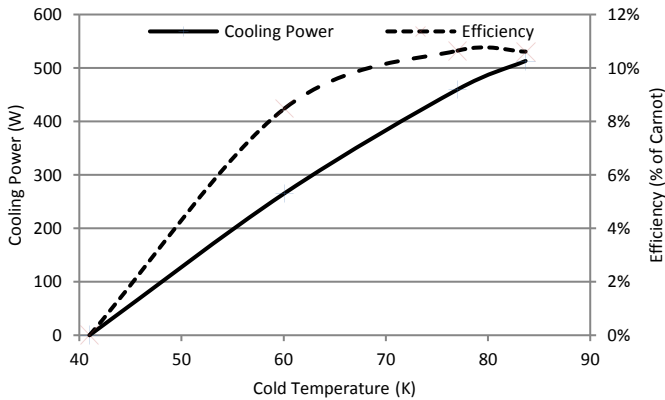


Figure 3 Cooling performance

The efficiency in Figure 3 is calculated using motor input power.

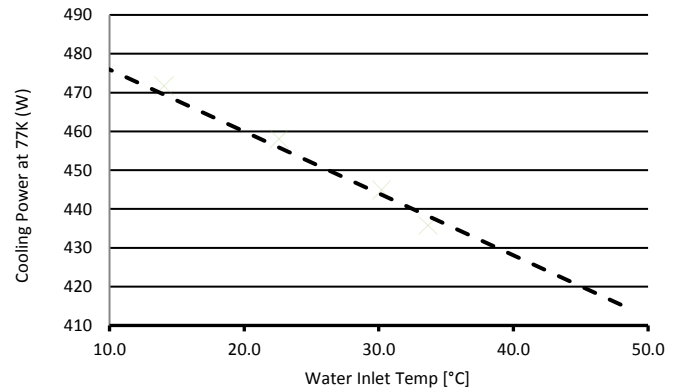


Figure 4 Coolant temperature dependence.

Figure 4 shows the cooling power derating of 1.6 W at 77 K per degree rise in cooling media temperature. This data is based on coolant flow of 15 L/min.

### 5. Air Cooled Addition

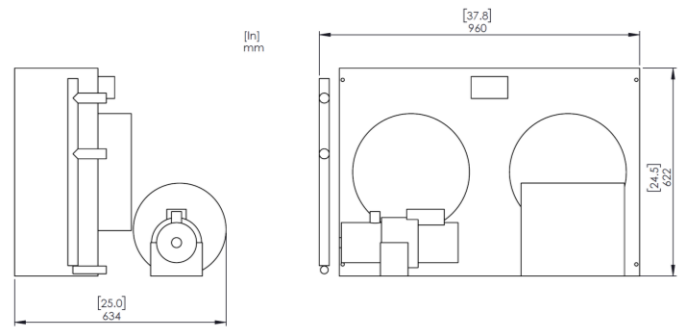


Figure 5 Air Cooling system.

Mass: 70 kg (dry)

Figure 5 shows the additional equipment required for air cooled operation. Separation from the cryocooler is trivial if required, alternately a frame can be supplied to support both the cryocooler, cooling system, controls and a dewar if required.

## 6. Installation Guideline

The unit must not be installed by the user. A qualified technician must install the unit.

- The unit must be mounted to an appropriate frame. Custom frames can be supplied to your specifications.
- This unit should be mounted on a level surface.
- For any bespoke applications please consult with the manufacturer.
- Direct sunlight (UV radiation) exposure should be avoided as it can damage some plastics used in this unit.
- Install only on robust concrete floor or similar.
- Every cryocooler unit is tested at the factory and carefully checked before shipment. However, independent to the checks made at the factory, the unit could be damaged during transport and therefore needs to be re-inspected.
- The unit must be installed indoors with adequate shelter.

## 7. Operating Guidelines

Electrical connection	
<b>Voltage</b>	3-phase, $U_{N4}=380$ to 480 V, +10%/-15%
<b>Frequency</b>	50/60 Hz $\pm 5\%$
<b>Power Factor</b>	$\cos\phi=90$
Environmental limits	
<b>Ambient temperature</b>	0 to +35°C standard 0 to +45°C by request
<b>Altitude</b>	0 to 1,000 m without derating 1,000 to 4,000 m with derating of 1%/100 m
<b>Relative humidity</b>	5 to 95%, no condensation allowed.
<b>Contamination levels</b>	No conductive dust allowed

## 8. Fault Indication

Interlock Monitor	Fault
light #1	The Oil pressure is <5 bar
light #2	Gas Pressure is < 5 bar
light #3	Top Plate temperature > 70°C
light #4	Machine temperature >70°C
light #5	Water pressure (pump inlet) < 5PSI
light #6	Emergency stop- pressed

## 9. Maintenance Schedule

All maintenance must be performed with the unit off.

Period	Work to be done
Annually	Oil/filter Change
Annually	Visually inspect vibration isolators
Annually	Check coolant pressure
Annually	Helium gas top up
4 years (40, 000 hours)	Replacement of seals and wear components

## 10. Compliance

All components within the pressure volume envelope have been designed to meet or exceed ASME VIII DIVISION 1 2013.

We are working together with a compliance consultant and Conformance UK to get CE approval for this unit. The pressure volume product is over 200 barL and therefore

external certification is required. All electronics and controls are commercially available with CE marking.

## 11. Warranty statement

- a) Full warranty on product for four (4) years of operation, from date of commissioning, subject to noted exclusions.
- b) Warranty covers replacement parts in that four year period, and provision of a technician on site for first 12 months (labour and disbursements not covered post 12 months).
- c) Return to base freight is covered one way if return is required.
- d) Not covered for normal wear and tear as specified in the preventative maintenance schedule.
- e) Not covered for over temperature operation, tampering, or misuse.
- f) Safe and reliable operation of this unit is guaranteed only with Fabrum Solutions spare parts.
- g) Fabrum Solutions will carry spare Pulse Tubes and at least one 'ready for dispatch' replacement part for the Diaphragm Pressure Wave Generator assembly (piston seals, bearings, cranks, master and slave piston and cylinder).