

## Portable Automated Helium Liquefiers PAHL200 & PAHLsmall



CRYO Industries Portable Automated Helium Liquefiers (PAHL) are the solution to the current liquid helium shortage and high cost of liquid helium.

PAHL Benefits:

- ◇ Easy operation
- ◇ Simple and efficient transfers
- ◇ High liquefaction rates
- ◇ Portability
- ◇ Zero maintenance dewar with built-in gas purification

CRYO Industries liquefiers operate with low dewar pressure (typically less than 1 psig). The separate pressurization port allows for quick, proper pressure adjustment for liquid helium transfer.

Two Models are available, PAHL200 and PAHLsmall.

When PAHL200 is in standby mode it is the only helium liquefier on the market that allows the refrigerator to be turned off for up to 10 hours with zero liquid helium loss.

PAHL200 Standby Mode features Include:

- ◇ Automatic or Manual
- ◇ Reduce energy costs by up to 40% when not liquefying
- ◇ Less operating hours = Less wear
- ◇ Quite Lab - turn liquefier off during the day

A Direct Recovery System is supplied that feeds the boil-off from your cryogenic research dewar(s) directly to the liquefier (PAHL). A back pressure valve is supplied with direct recovery system in order to operate cryostat/research dewar at normal, positive pressure.

## Features

Both PAHL200 and PAHLsmall include an integral liquid helium transfer line and a Touch Tablet Control Interface.

### *Touch Tablet Displays Operating Parameters*



PAHL200 and PAHLsmall are supplied with a Microsoft Surface Pro3 Tablet with Windows 10 operating system installed.

The 12" HD tablet displays the operating parameters of the liquefier and is not integral to the system operation.

Take the tablet anywhere you go!

### *Integral Liquid Helium Transfer Line*



The integral liquid helium transfer line allows for simple, seamless transfers.

A user of PAHL200 with the integrated transfer line at Columbia University stated that:

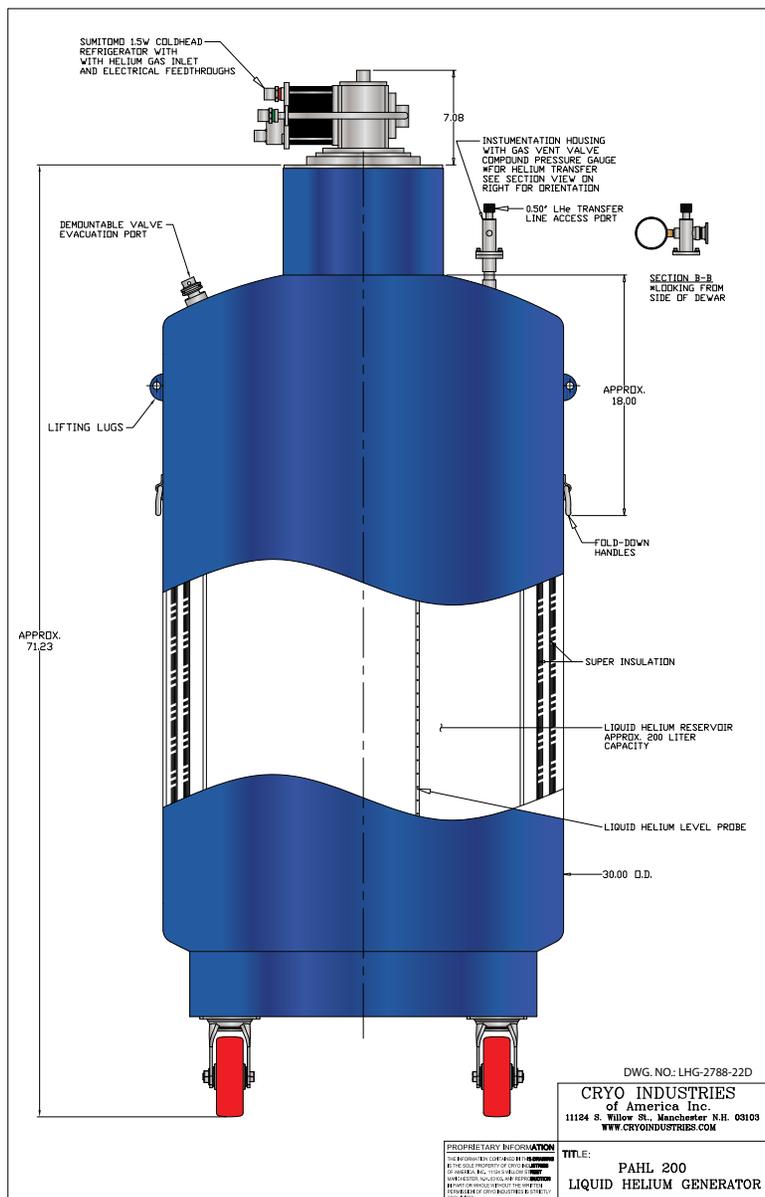
“Transferring liquid helium from the liquefier (PAHL200) is easier than transferring from a storage dewar”.

### *CRYO EXCLUSIVE! Optional Liquid Helium Bath Access Port For Sample Insertion*

PAHL is the only liquefier on the market that offers an optional 1.50 inch nominal access port to the liquid helium bath.

This port allows insertion of a Sample “Dipper” Probe or Variable Temperature Insert.

## PAHL200: Portable Automated Helium Liquefier



### PAHL200 Features:

PAHL200 is like having your own liquid helium store!

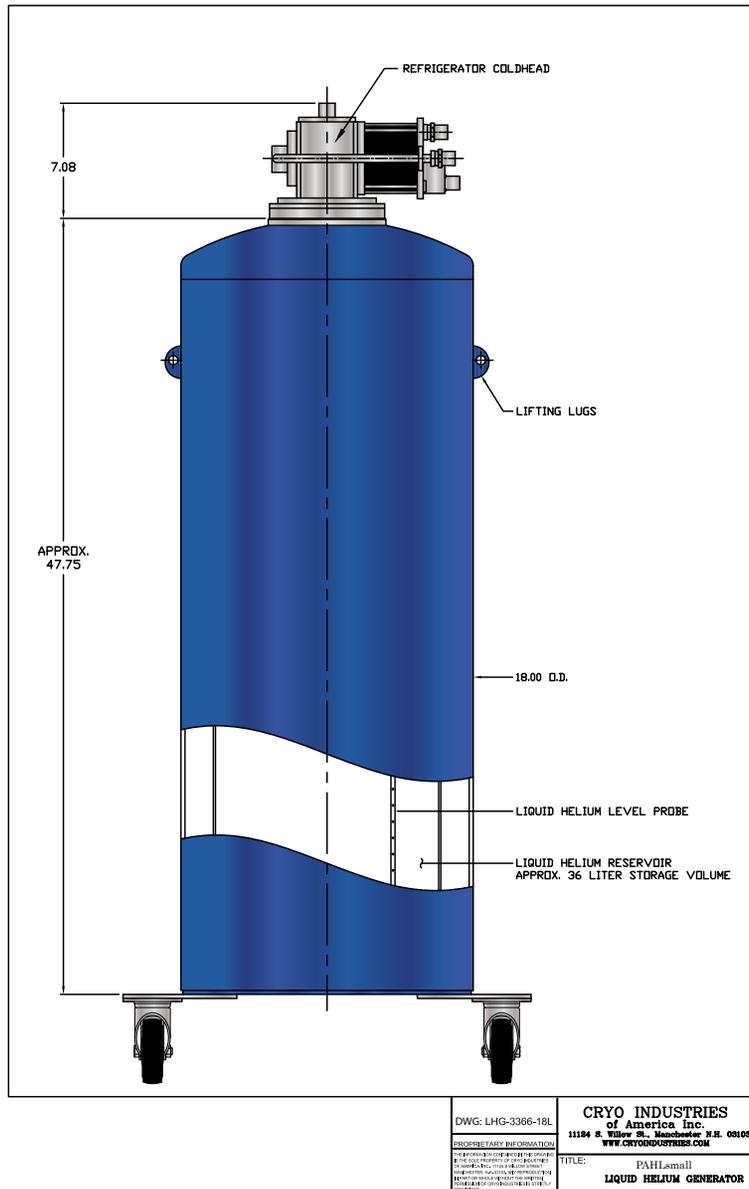
- Liquefaction Rate: <22 liters/day
- 200 Liter Dewar Capacity
- Built in liquid level probe
- Separate Stand-alone Monitors
- Air or Water Cooled Compressor
- Direct Helium Gas Recovery System
- Integrated helium transfer line
- Fully Automated Tablet Panel Control
- Internet and Wireless Enabled

### Optional for PAHL200 :

- 1.50" Nominal Liquid Helium Bath Access port for sample insertion (Dipper Probe or VTI)



## PAHLsmall: Portable Automated Helium Liquefier



### PAHLSMALL FEATURES:

PAHLsmall is the first liquefier designed for the small lab...it is THE SMALL LAB SOLUTION!

- 60 Liter Capacity Helium Liquefier Dewar
- Average Liquefaction Rate of 18 liters/day
- Direct Helium Gas Recovery System Included
- Integrated helium transfer line
- Fully Automated Tablet Panel Control
- Internet and Wireless Enabled

### Optional for PAHLsmall :

- Liquid Nitrogen Pre-Cool Loop for fast dewar cooldown



## SHI Cryogenics F-70H Water Cooled Helium Compressor Specifications

**F-70H Compressor (high voltage model)** Details: Two (2) size 8M gas couplings; water-cooled; 480 (±10%) V3~, 60 Hz or 380-415 (±10%) V3~, 50 Hz.

**F-70L Compressor (low voltage model) and F-70LP Compressor (low voltage plus model)**  
 Details: Two (2) size 8M gas couplings; water-cooled; 200 (±10%) V3~, 50/60 Hz.

Power consumption: Gifford-McMahon (GM) Operation      Startup

6.6 – 6.9 kW @ 50 Hz	<8.5 kW @ 50 Hz
7.5 – 7.8 kW @ 60 Hz	<9.0 kW @ 60 Hz

Rated load current:  
 For the F-70H compressor, 13 amperes  
 For the F-70L compressor, 24 amperes (GM only)

### Environmental Requirements

	<u>Operating</u>	<u>Storage</u>
Ambient Temperature	4°C to 40°C (40°F to 104°F)	-20°C to 65°C (-4°F to 150°F)
Relative Humidity	30% to 70%	10% to 90% (non-condensing)
Magnetic Field Limits	<50 Gauss	
Atmospheric Pressure	70 kPa to 110 kPa	20 kPa to 110 kPa

### Cooling Requirements

<u>Application</u>	<u>Cooling Water Flow Rate</u>
4K GM and 10K GM Cold Head (F-70H/F-70L)	6 to 9 L/min (1.6 to 2.4 gpm)
Cooling water inlet temperature:	5°C to 25°C (41°F to 77°F)
Cooling water outlet temperature:	45°C (113°F) maximum
Cooling water supply pressure:	8 bar (116 psig) maximum

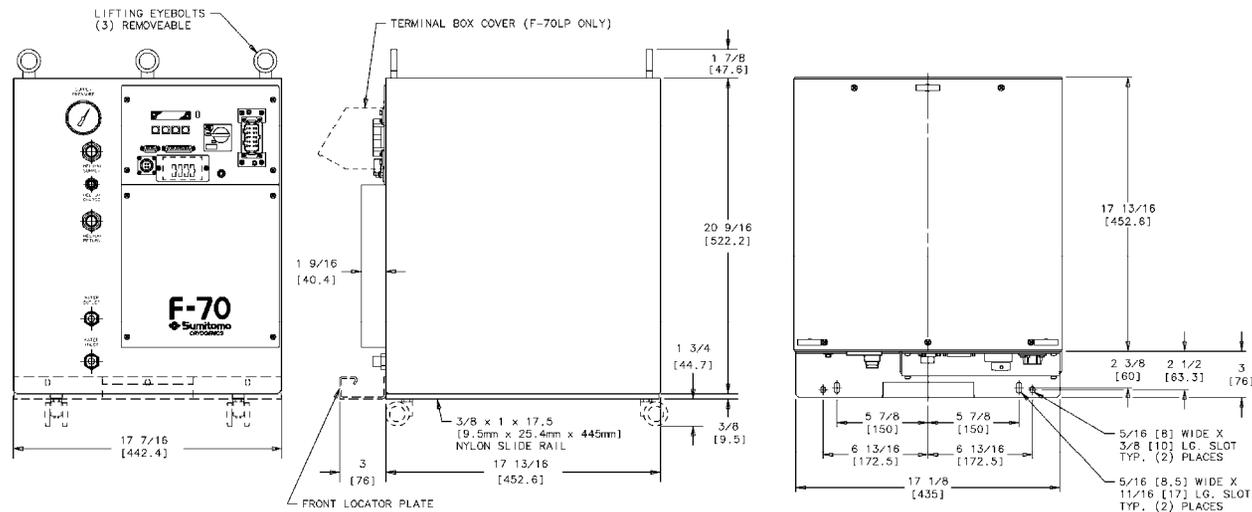


### Mounting Position

Compressor must be mounted base down and level within 5 degrees of horizontal.

### Cooling Requirements (See Figures 2 and 3)

<u>Application</u>	<u>Cooling Water Flow Rate</u>
4K GM and 10K GM Cold Head (F-70H/F-70L)	6 to 9 L/min (1.6 to 2.4 gpm)
4K PT Cold Head (F-70H/F-70LP)	6.8 to 9 L/min (1.8 to 2.4 gpm)
Cooling water inlet temperature:	5°C to 25°C (41°F to 77°F)
Cooling water outlet temperature:	45°C (113°F) maximum
Cooling water supply pressure:	8 bar (116 psig) maximum
Pressure drop at 9 L/min:	<1 bar (<14.5 psig)
Alternative coolant	50% pure ethylene glycol + 50% water
Ethylene glycol/water (50/50) flow rate	7.8 to 11.7 L/min (2.1 to 3.1 gpm)



## ***Electronic Components Included with PAHL Helium Liquefier Systems***

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### ***Single Channel Cryogen Level Monitor***



**AC Input:** 100-240V a.c., 50-60 Hz, 30 Watts

**Operating Temperature:** 15 °C to 35 °C

**Relative Humidity:** 10% to 95%, non-condensing

**Overall Dimensions:** 185 mm W X 67 mm H X 197 mm D

**Weight:** 1.0 kg

### ***Single Channel Temperature Monitor***



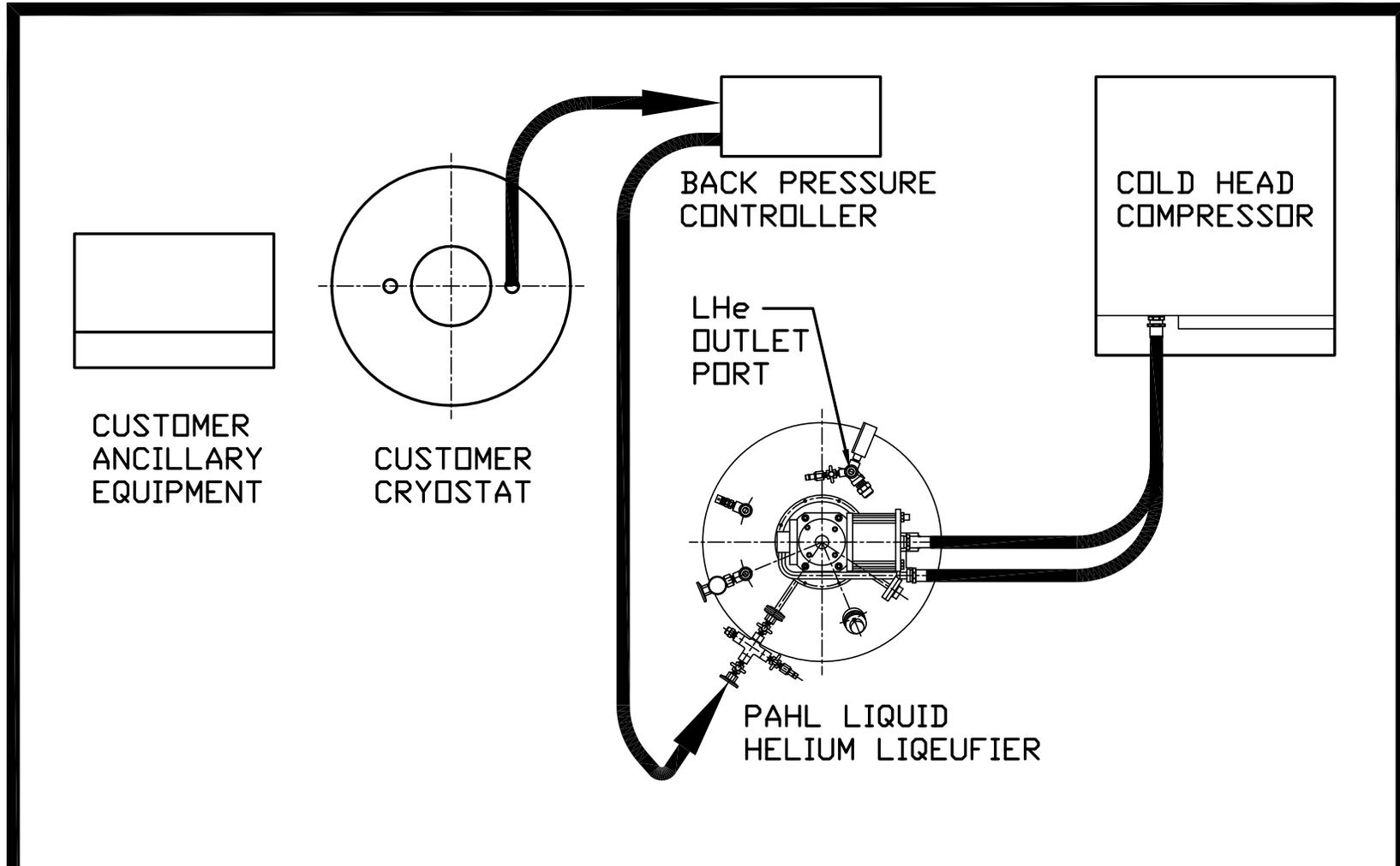
**Power:** 100 - 240 VAC, 50 or 60 Hz, 0.3 A max

**Ambient Temperature:** 15 °C to 35 °C at rated accuracy

**Overall Dimensions:** 96 mm W × 48 mm H × 166 mm D  
(3.8 in × 1.9 in × 6.5 in)

**Weight:** 0.15 kg (0.33 lb)

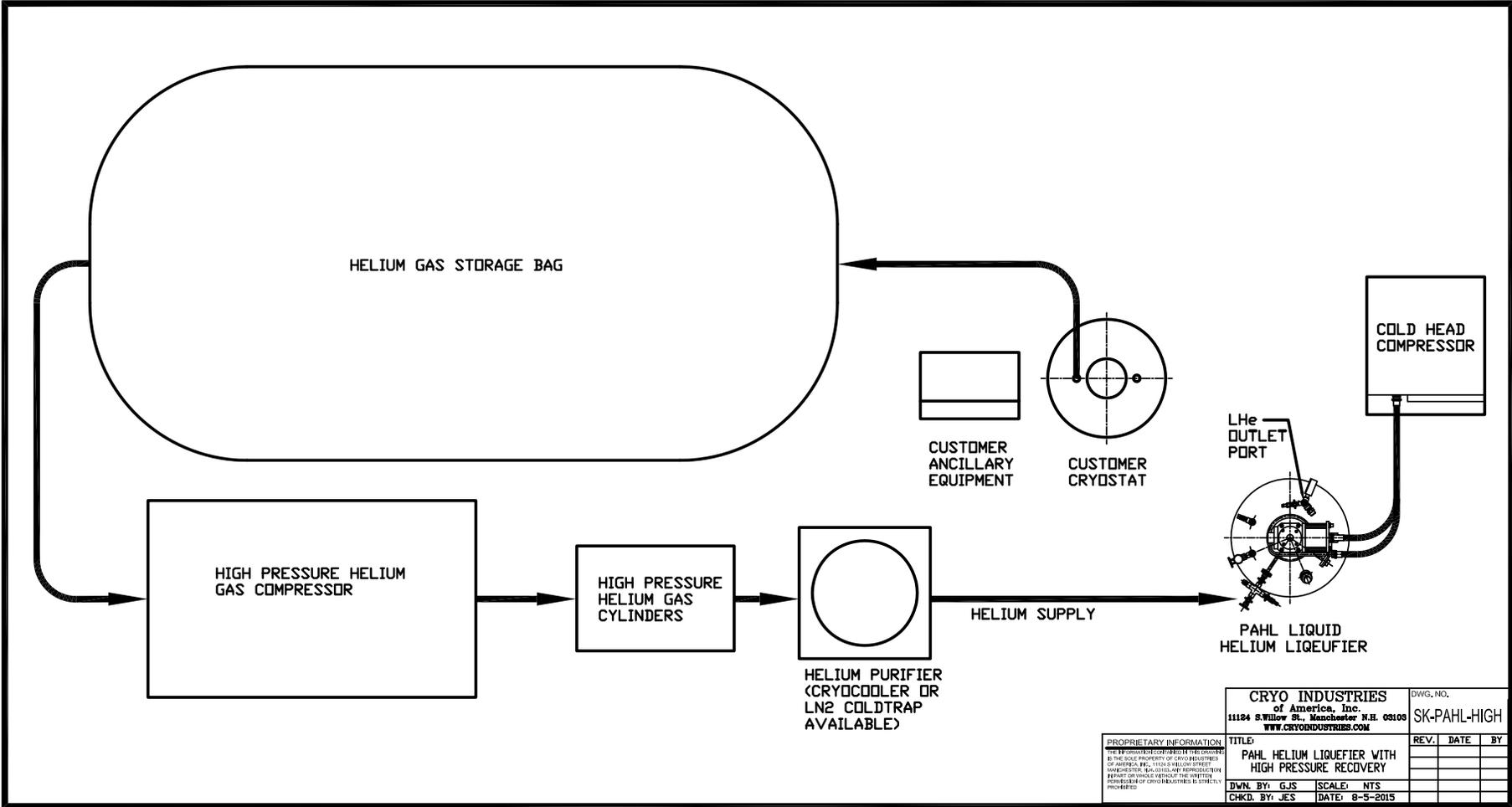
*PAHL with Direct Recovery System*



<b>CRYO INDUSTRIES</b> of America, Inc. 11124 S.Willow St., Manchester N.H. 03103 WWW.CRYOINDUSTRIES.COM		DWG. NO. <b>SK-PAHL-DIRECT</b>		
		REV.	DATE	BY
TITLE: PAHL HELIUM LIQUEFIER WITH DIRECT RECOVERY				
DWN. BY: GJS	SCALE: NTS			
CHKD. BY: JES	DATE: 8-5-2015			

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# PAHL with High Pressure Recovery System



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		SK-PAHL-HIGH
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**11124 South Willow Street  
Manchester, NH 03103  
Ph: 603-621-9957  
[www.cryoindustries.com](http://www.cryoindustries.com)  
[cryo@cryoindustries.com](mailto:cryo@cryoindustries.com)**