
Brooks Automation CTI-Cryogenics On-Board Cryopumps Configuration Guide

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Brooks Automation
15 Elizabeth Drive
Chelmsford, MA 01824
Phone +1 (978) 262-2400
Fax +1 (978) 262-2500
For emergencies, contact Technical Support +1 (978) 262-2900
www.brooks.com

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1 System Configurations

Overview

This section describes the single and multiple On-Board Cryopump, Waterpump, TurboPlus Vacuum Pump and Cryo-Torr Cryopump System configurations. Use this section to determine your customer's configuration and the components involved. Use the worksheet at the end of this section to help properly configure your customer's sales order.

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Single On-Board or Waterpump Configuration

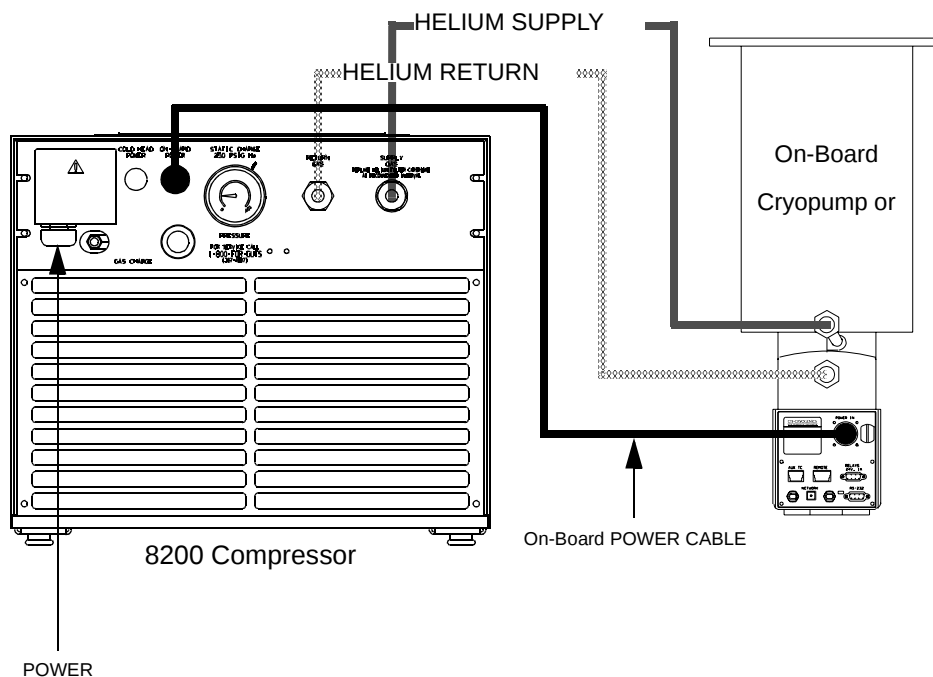


Figure 1-1: Typical Single On-Board Cryopump or Waterpump Application

Cryo-Torr Cryopump

A single Cryo-Torr Cryopump can be connected to a 8200 Compressor as shown in [Figure 1-2](#).

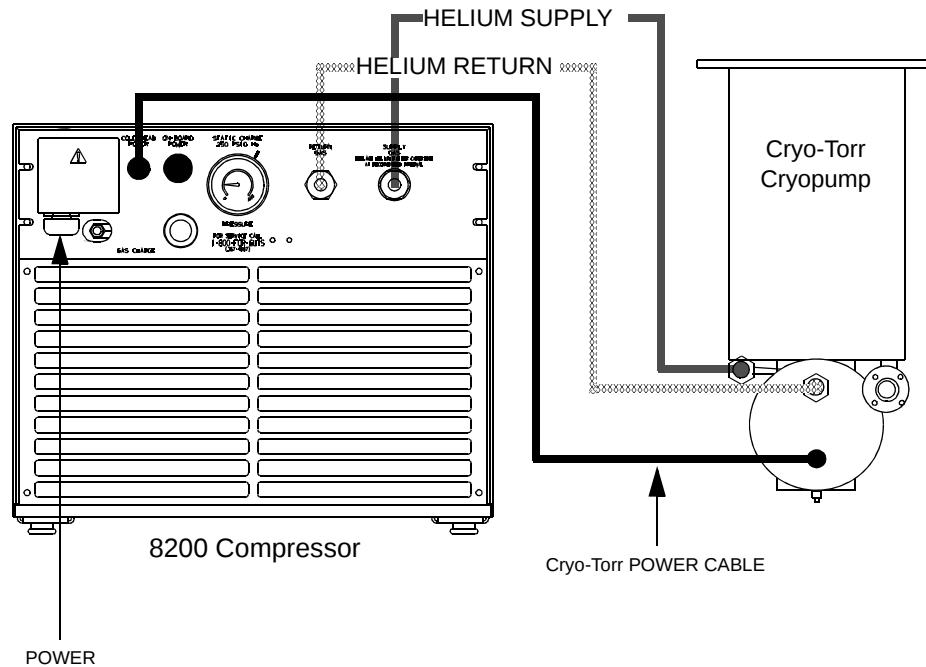


Figure 1-2: Typical Single Cryo-Torr Cryopump Application

Multiple Cryopump Configurations

The On-Board Splitter Box permits the connection of up to three On-Board Cryopumps or Waterpumps to one 9600 Compressor as shown in [Figure 1-3](#). The Network Terminal provides control of up to 20 pumps from a single point and provides an On-Board System interface to the customer host computer.

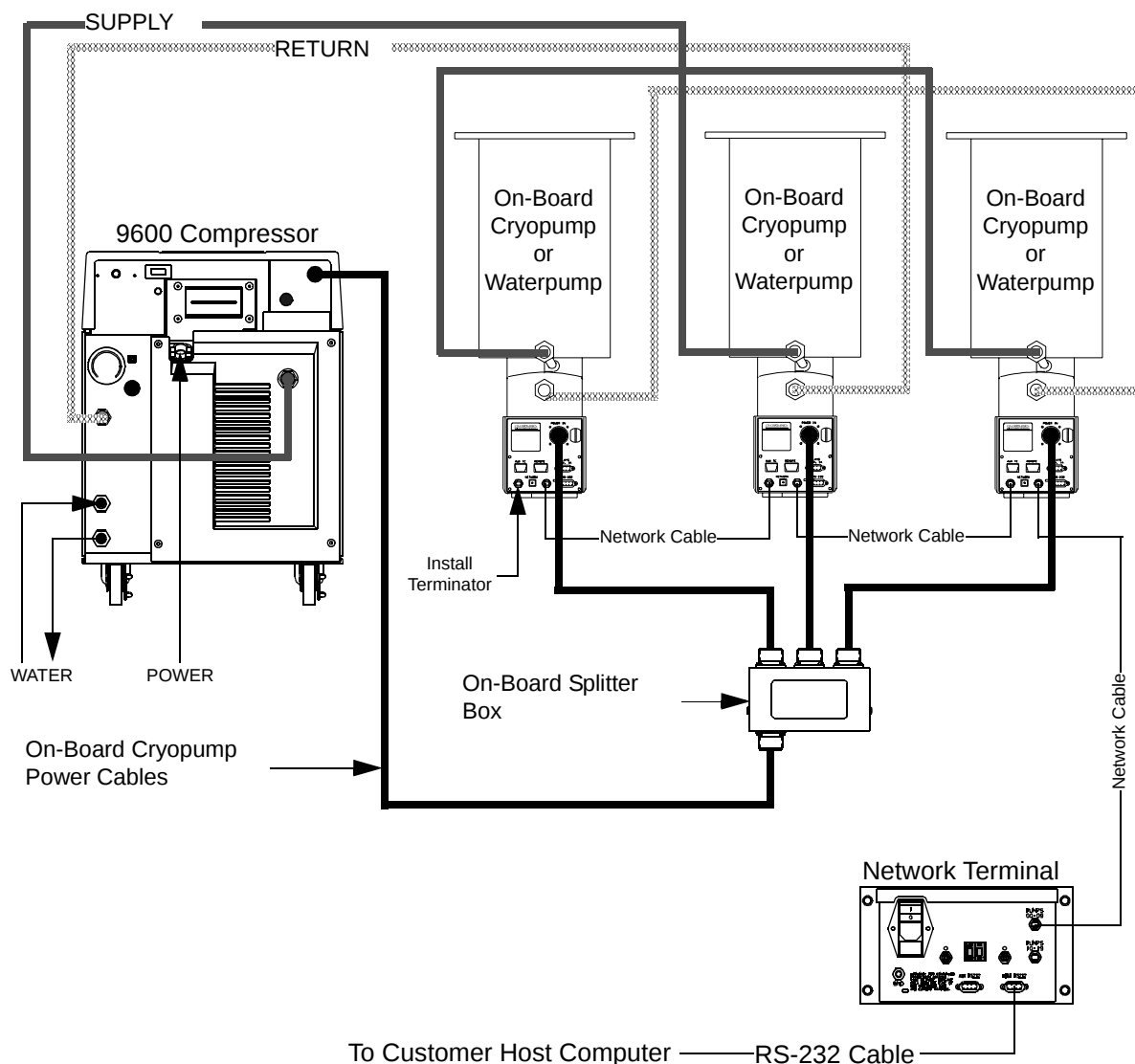
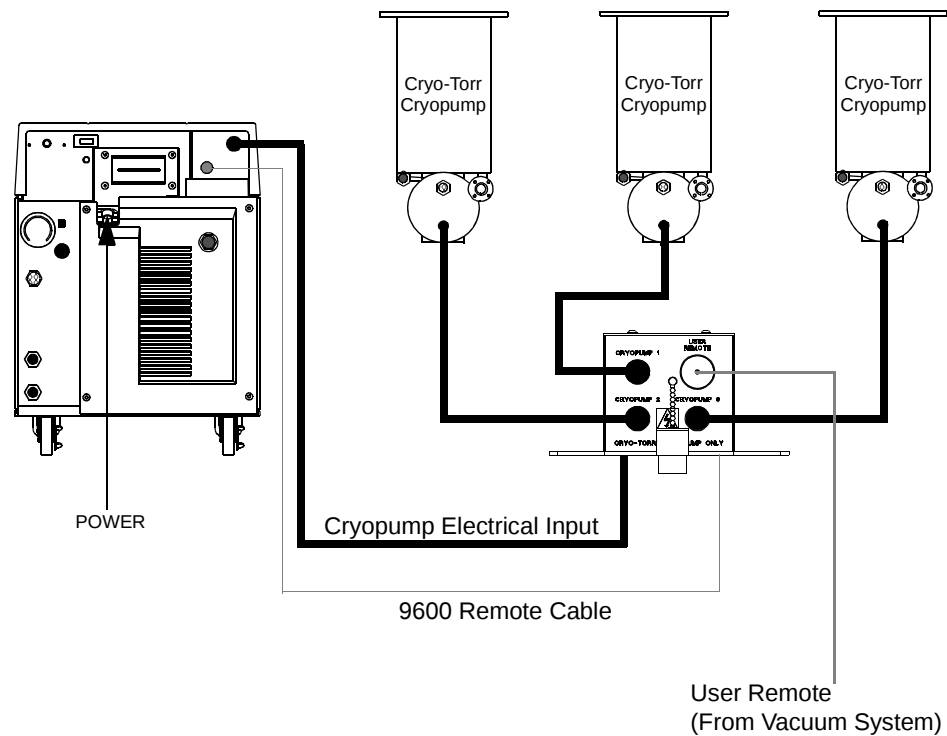


Figure 1-3: Typical Multiple On-Board Cryopump or Waterpump Application

The Cryo-Torr Interface permits the connection of up to three Cryo-Torr Cryopumps to one 9600 Compressor as shown in [Figure 1-4](#).



NOTE: This configuration allows the regeneration of Cryo-Torr Cryopumps individually or simultaneously without turning off the compressor.

Figure 1-4: Typical Multiple Cryo-Torr Cryopump Application

Customer Site Worksheet

Customer Name: _____ Company: _____

Application: _____ Salesperson: _____ Date: _____

Table 1-1: System Component Sales Order

	Quantity	Part Number	Description
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			

Helium Distribution Diagram

Electrical Distribution Diagram

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Helium Flexlines

Overview

This section describes the helium Flexline ordering information.

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[Flexline Compatibility.....2-2](#)

[Flexline Description.....2-3](#)

Flexline Compatibility

Table 2-1 provides maximum flexline lengths and diameters for various Cryopump and Compressor configurations.

NOTE: Be sure to follow the guidelines in Table 2-1 to avoid system performance issues.

NOTE: Table 2-1 can only be used for compressor applications that do not use a helium manifold. This table must not be used when compressors are connected to a helium manifold. Contact CTI-CRYOGENICS engineering for proper flexline configuration

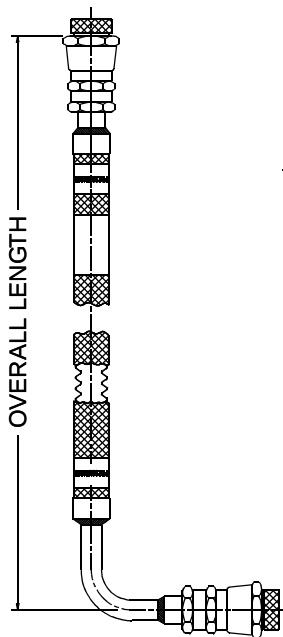
Table 2-1: Maximum Helium Flexline Lengths

System Configuration	1/2 inch ID Flexline Length	3/4 inch ID Flexline Length
Single: On-Board 4, On-Board 8, On-Board 250, Cryo-Torr 8 or Cryo-Torr 250 Cryopump or On-Board Waterpump (350 refrigerator) connected to a 8200, 8510, 9600 or 9700 Compressor.	250 feet maximum	500 feet maximum
Multiple: On-Board 4, On-Board 8, On-Board 250, Cryo-Torr 8, Cryo-Torr 250 or On-Board Waterpump (350 & 1050 refrigerator) connected to a 8510, 9600 or 9700 Compressor.	40 feet maximum	300 feet maximum
Single: On-Board 10, On-Board 400, Cryo-Torr 10, Cryo-Torr 400 On-Board Waterpump (1050 refrigerator) connected to a 8510, 9600 or 9700 Compressor.	60 feet maximum	400 feet maximum

Flexline Description

The information on the following pages provide a description of the most commonly used helium Flexlines.

Female Straight Coupling x Female Elbow Coupling



Part Number	Diameter (ID)	Overall Length
8043074GXXX	1/2 inch	Order from 1 to 80 feet
8043081GXXX	3/4 inch	

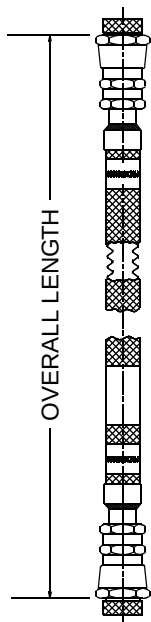
NOTE: Lengths are available in 1 foot increments up to a maximum of 80 feet. Measurements are expressed in inches.

Example: Standard stocked lengths are:

G120 = 10 ft.

G240 = 20 ft.

Female Straight Coupling x Female Straight Coupling



Part Number	Diameter (ID)	Overall Length
8043075GXXX	1/2 inch	Order from 1 to 80 feet
8043085GXXX	3/4 inch	

NOTE: Lengths are available in 1 foot increments up to a maximum of 80 feet. Measurements are expressed in inches.

Example: Standard stocked lengths are:

G120 = 10 ft.

G240 = 20 ft.

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3

Helium Fittings

Overview

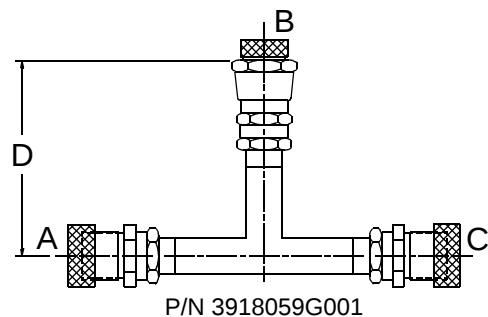
This section describes the most commonly used helium flexline fittings; tees, crosses, elbows, Y-tubes, and couplings.

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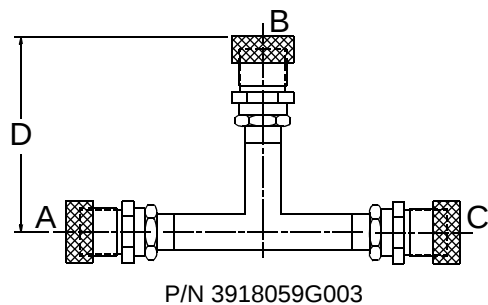
Helium Tee

A helium tee is used to interconnect supply and return flexlines between compressors and On-Board or Cryo-Torr Cryopumps.

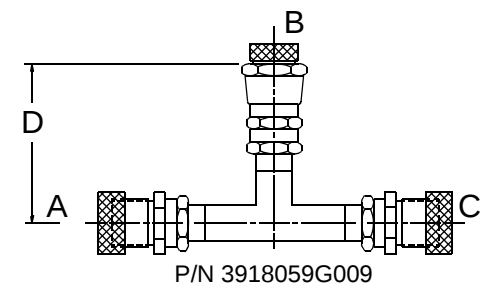


Part Number	A	B	C	D (inches)
3918059G001	Male	Female	Male	4 1/8
3918059G003	Male	Male	Male	3 3/4
3918059G009	Male	Female	Male	3 1/4

NOTE: Helium tee P/N 3918059G001 is used for splitting helium flexlines at the compressor. Helium tee P/N 3918059G003 is used for splitting helium flexlines in-line. Refer to [Figure 3-1](#) for examples of splitting helium flexlines with a helium tee.



NOTE: These helium tees connect to both 1/2 inch and 3/4 inch helium flexlines.



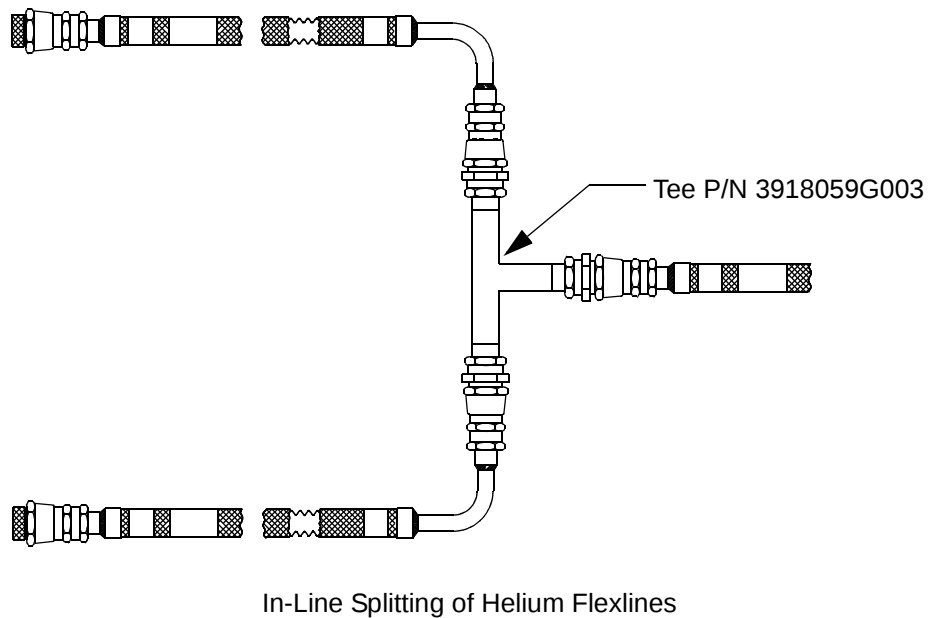
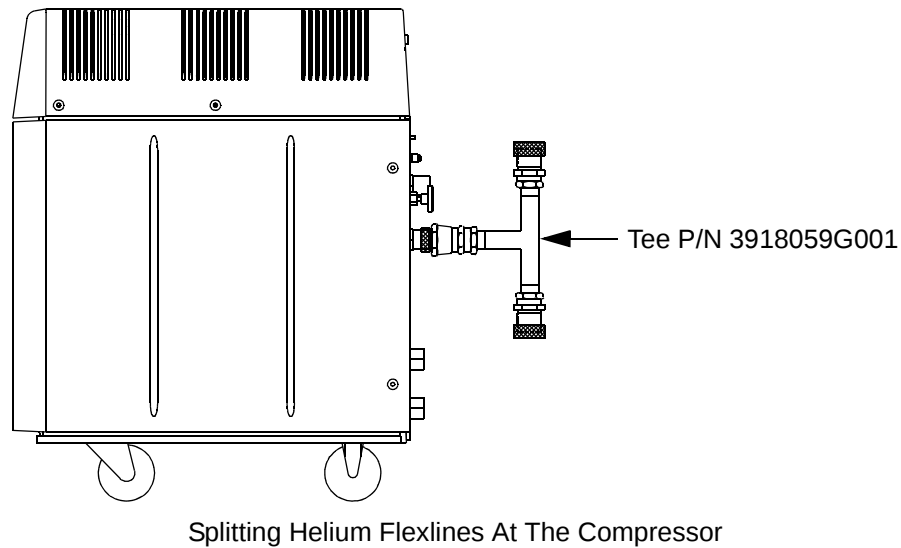
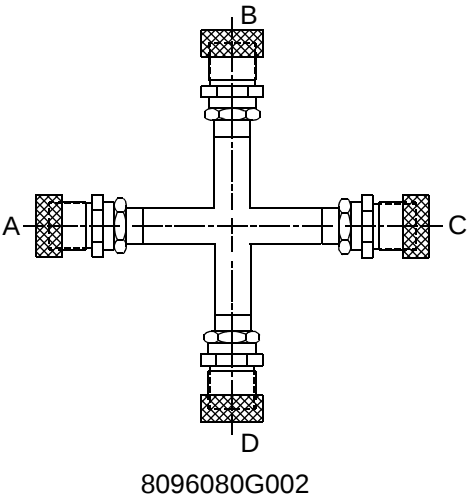


Figure 3-1: Examples of Helium Flexline Splitting

NOTE: To provide equal distribution of helium, try to use approximately equal length helium flexlines.

Helium Cross

A helium Cross is used to interconnect supply and return flexlines between compressors and On-Board Cryopumps.



Part Number	A	B	C	D
8096080G001	Male	Male	Male	Female
8096080G002	Male	Male	Male	Male

NOTE: This helium cross connects to both 1/2 inch and 3/4 inch helium flexlines.

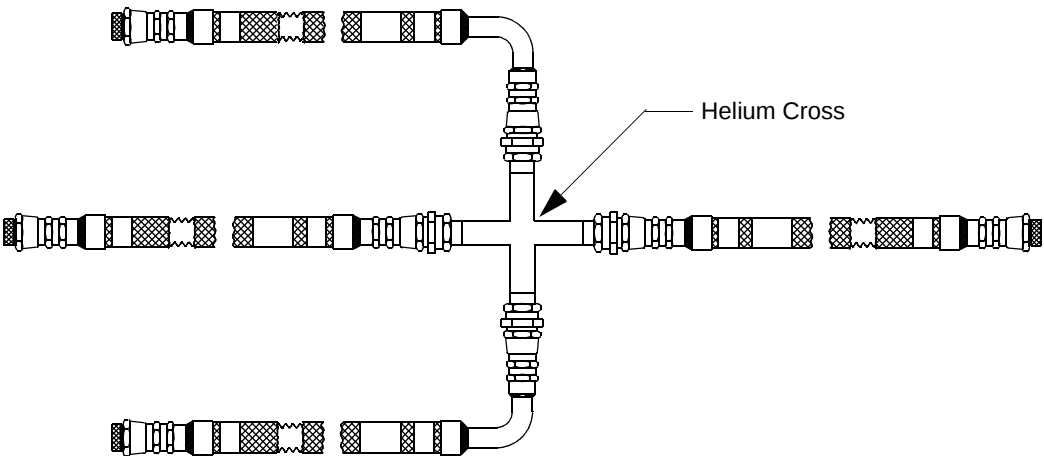


Figure 3-2: Typical Helium Cross Application

NOTE: To provide equal distribution of helium, try to use approximately equal length helium flexlines.

Helium Coupling

A helium coupling is used to interconnect helium flexlines so a longer flexline can be created, or a flexline can be secured to a metal panel.

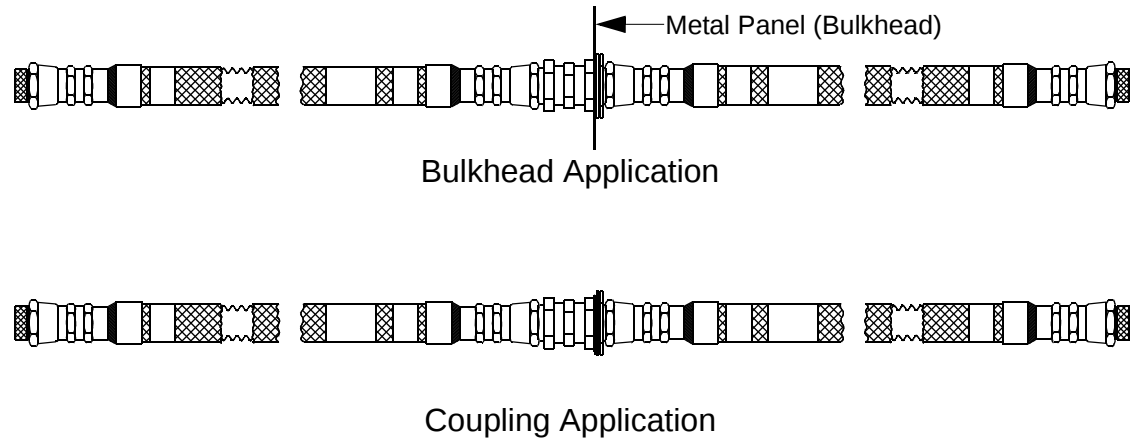
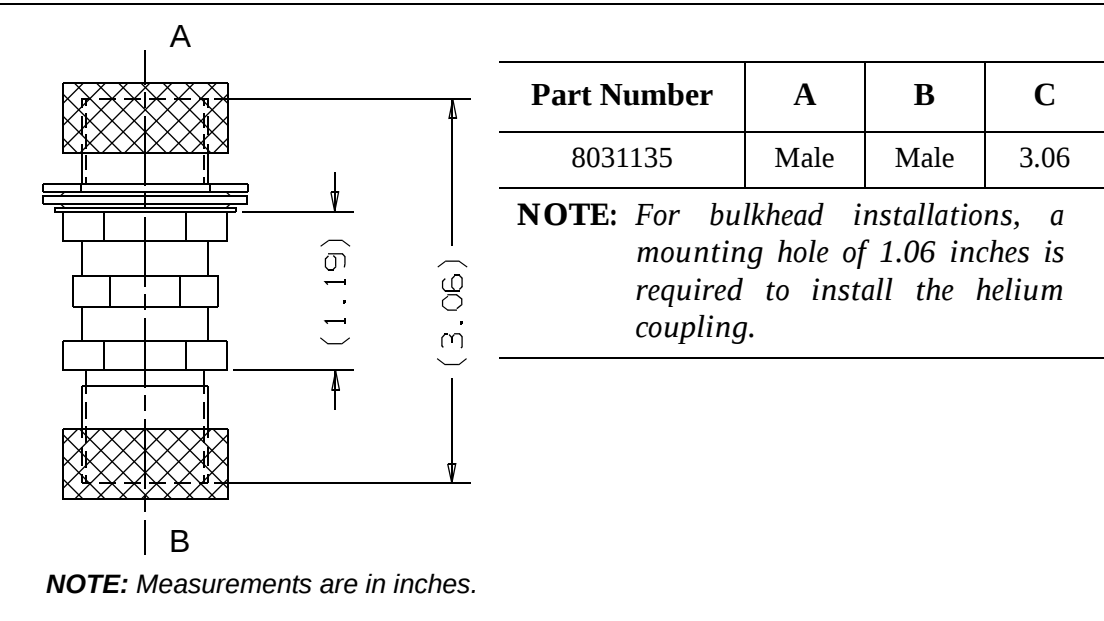


Figure 3-3: Typical Helium Coupling Applications

Helium Y-Tube Assembly

A helium Y-Tube Assembly is used to interconnect supply and return flexlines between compressors and On-Board and Cryo-Torr Cryopumps.

Part Number	A	B	C	D (inches)
8039805G001	Male	Male	Male	2.97
8039805G002	Female	Male	Male	3.23

NOTE: A helium Y-Tube P/N 8039814G001, and 8039805G001 and 8039805G002 are used for splitting helium flexlines in-line.

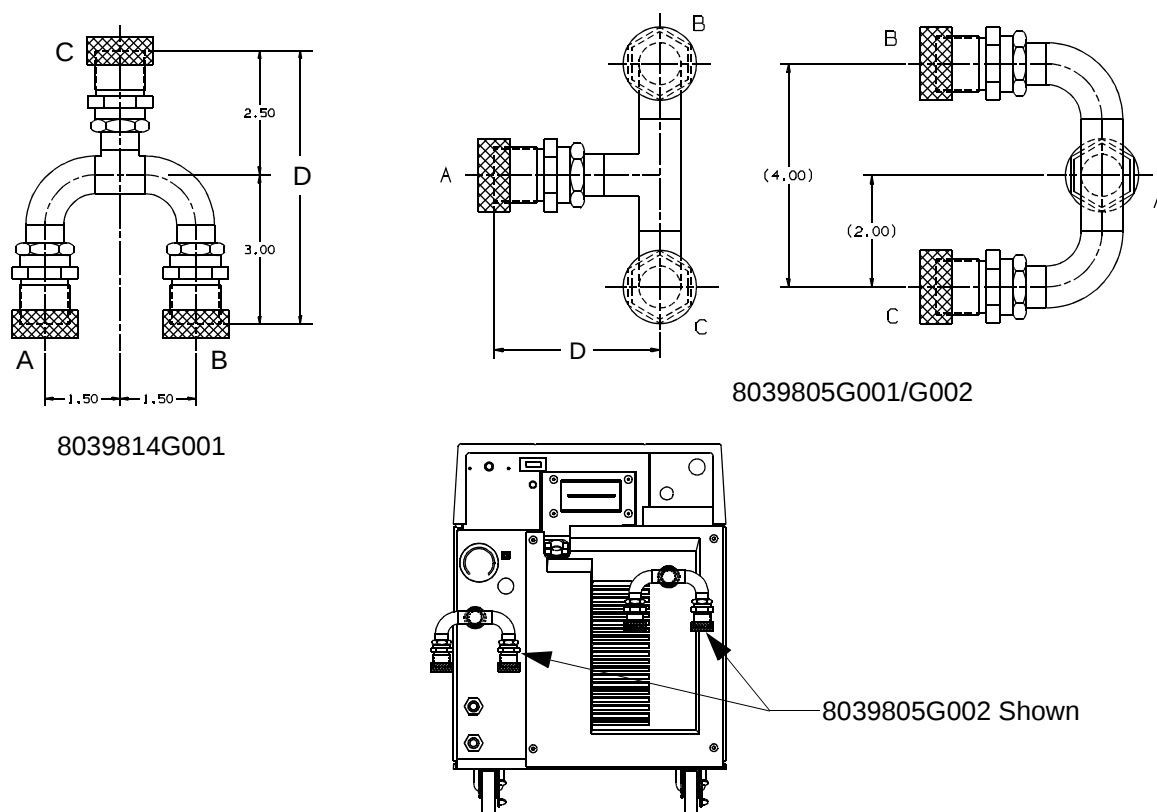


Figure 3-4: Typical Installation of Helium Y-Tube Assemblies

Helium Elbow Assembly 90°

A helium elbow assembly is used to interconnect supply and return flexlines between compressors and On-Board and Cryo-Torr Cryopumps.

Part Number	A	B	C	D (inches)
8039913G001	Female	Male	4.00	4.25

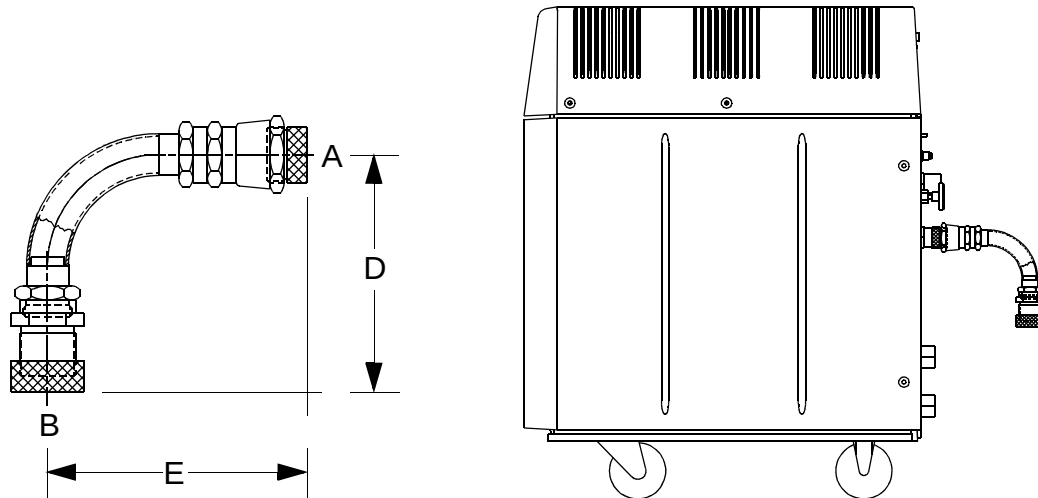


Figure 3-5: Typical Helium Elbow Assembly Installation

Helium Right Angle Adapter

A helium right angle adapter is used to interconnect supply and return flexlines between compressors and On-Board and Cryo-Torr Cryopumps.

Part Number	A	B	C	D (inches)
8039717G001	Female	Male	2.26	2.77

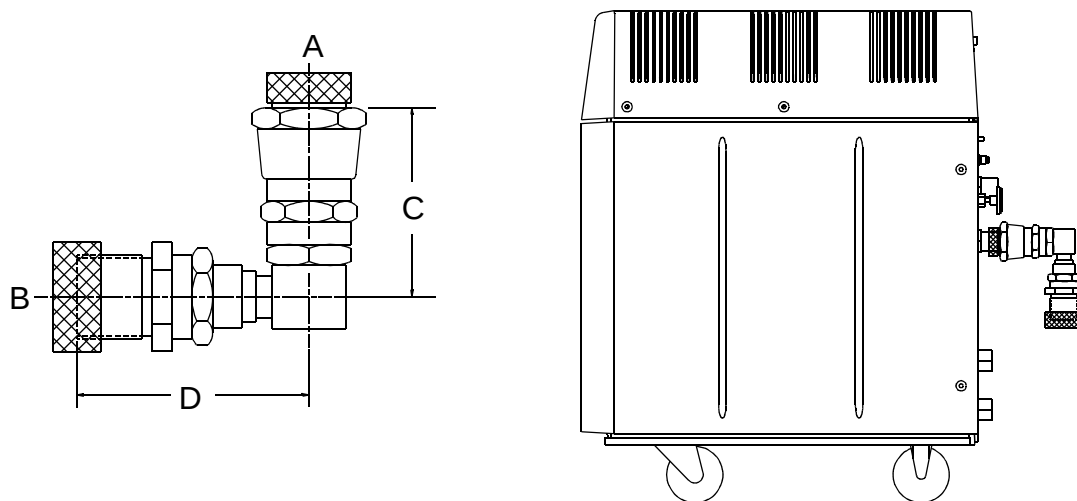


Figure 3-6: Typical Helium Right Angle Adapter Installation

4

Cable Assemblies

Overview

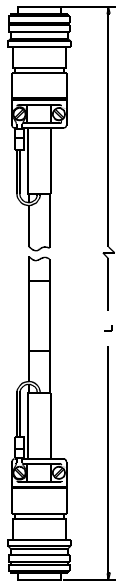
Cable Assemblies are used to provide power to On-Board Modules, provide network communication, data communication between customer host computers and NetLink chassis, and remote power control between compressors and customer vacuum systems. Each of these cable assemblies are discussed within the section.

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On-Board Power Cables

On-Board Power Cables connect between the POWER connector on a compressor, frequency converter, or three phase motor controller.



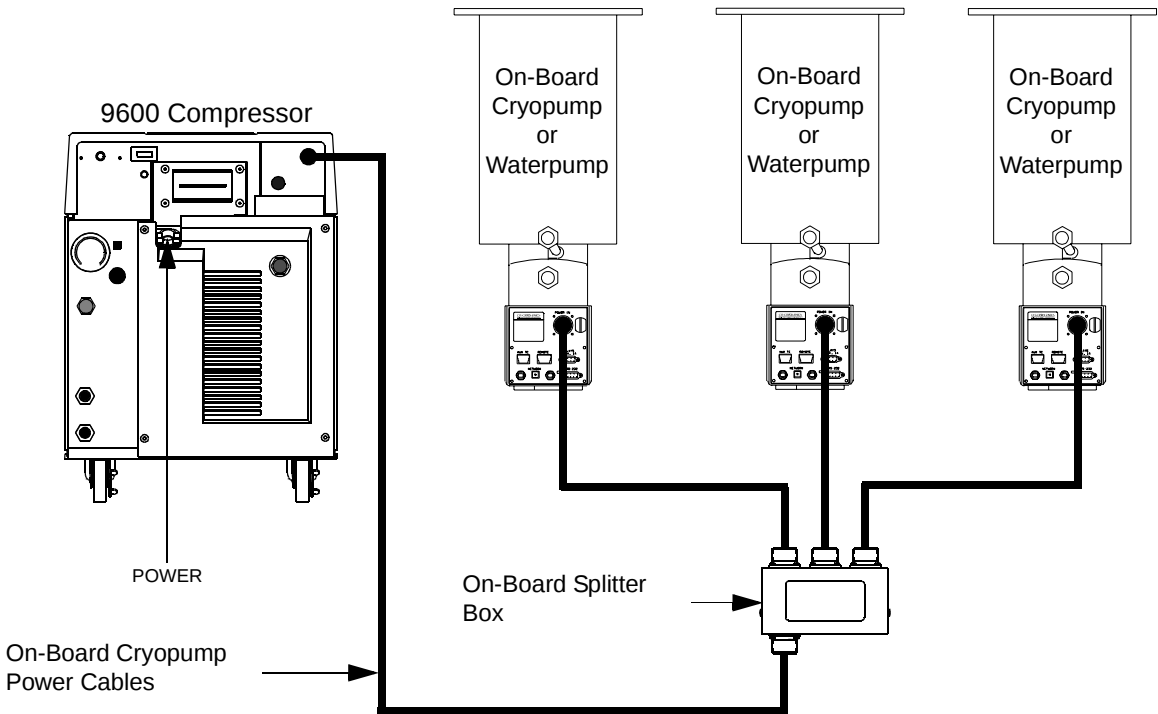
Part Number	Overall Length
8112463GXXX	Order from 1 to 99 feet

NOTE: Lengths are available in 1 foot increments up to a maximum of 99 feet.

Example G100 = 10 feet.

8115348GXXX	Order from 100 to 200 feet
-------------	----------------------------

NOTE: Lengths are available in 1 foot increments from 100 feet to a maximum of 200 feet.



NOTE: All On-Board Cryopump Power Cables in this diagram are part number 8112463GXXX.

Figure 4-1: On-Board Power Cable Diagram Example

On-Board Panel Mount Power Cable

The On-Board panel mount power cable is used to interconnect cryopumps and compressors through a wall or other partition within a customer’s tool.

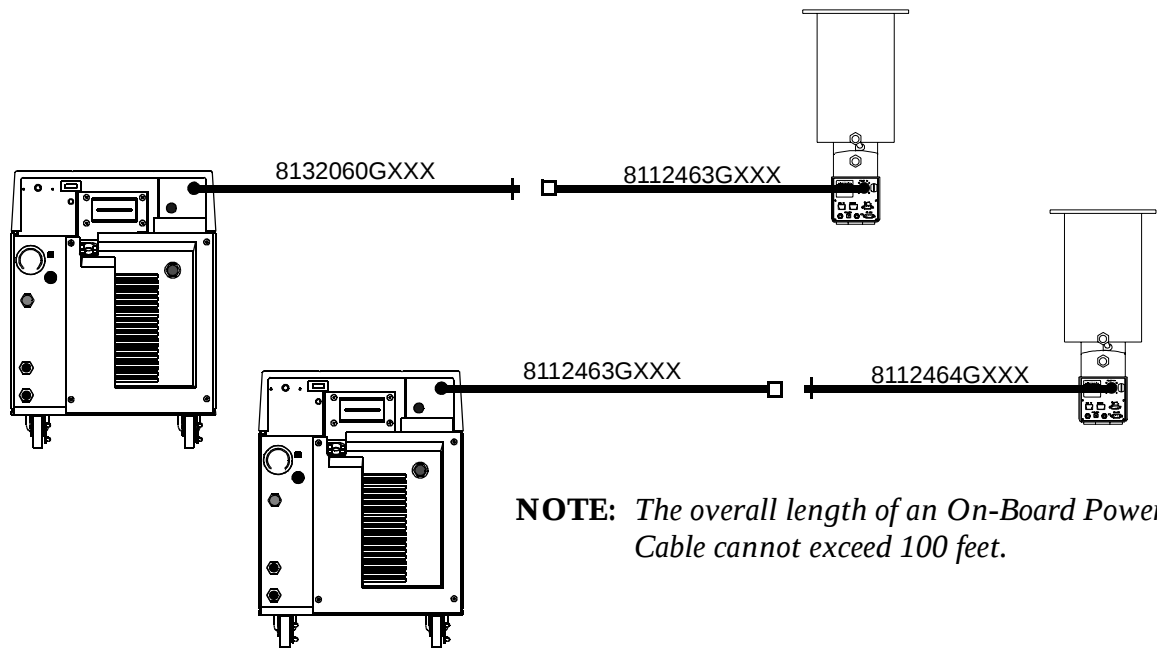
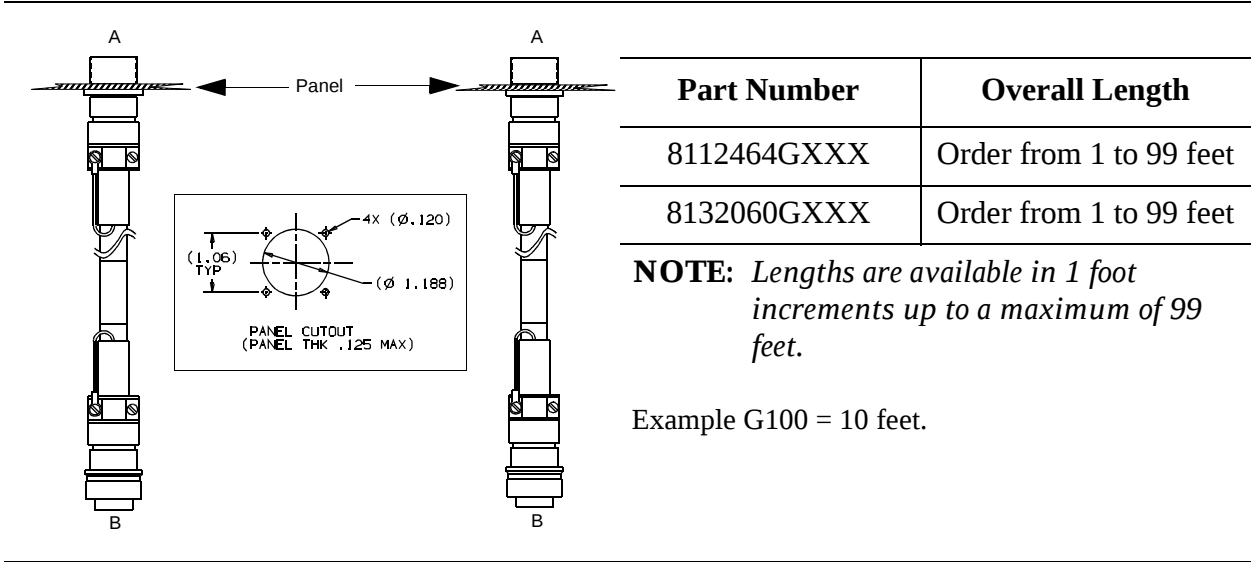
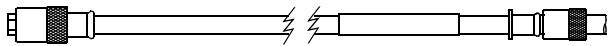


Figure 4-2: Typical On-Board Panel Mount Power Cable Installations

Network Communication Cable

Network Communication Cables are used to provide network communication between On-Board Cryopumps or Waterpumps and Network Terminals.



Part Number	Overall Length
8115161GXXX	Order from 1 to 999 feet

NOTE: *NOTE: Lengths are available in one foot increments up to a maximum of 999 feet.*

Example: Standard stocked lengths are: G010 = 10 ft. G020 = 20 ft.

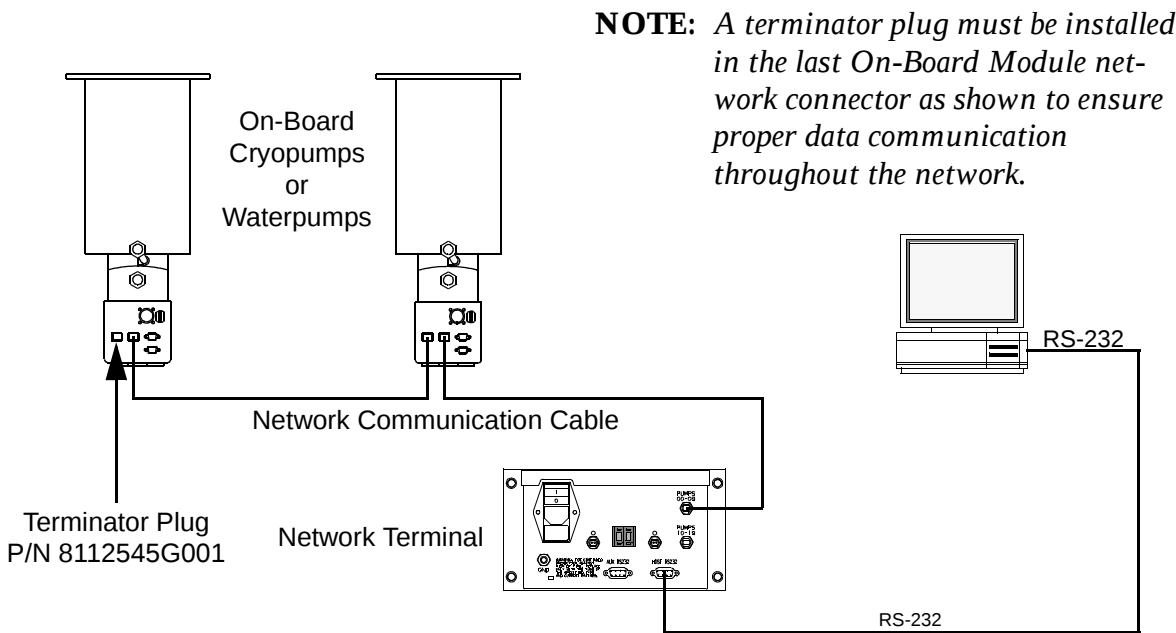


Figure 4-3: Network Communication Cable Diagram Example

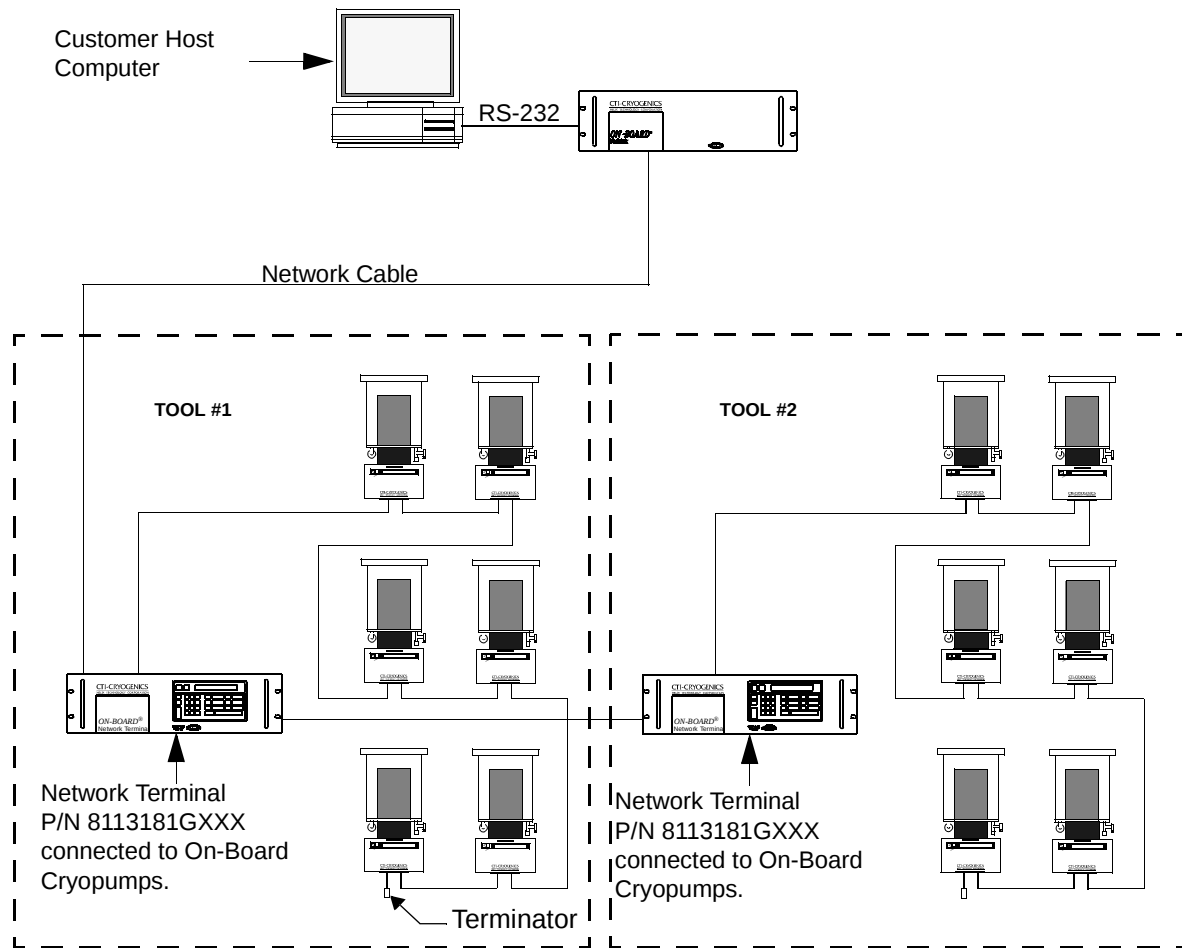


Figure 4-4: On-Board Multi-Network Diagram Example

On-Board RS-232 DB9-DB25 Cable

The On-Board RS-232 DB9-DB25 Cable provides data communication between the serial port (9 or 25 pin) on the customer’s Personal Computer and a CTI-Cryogenics product.

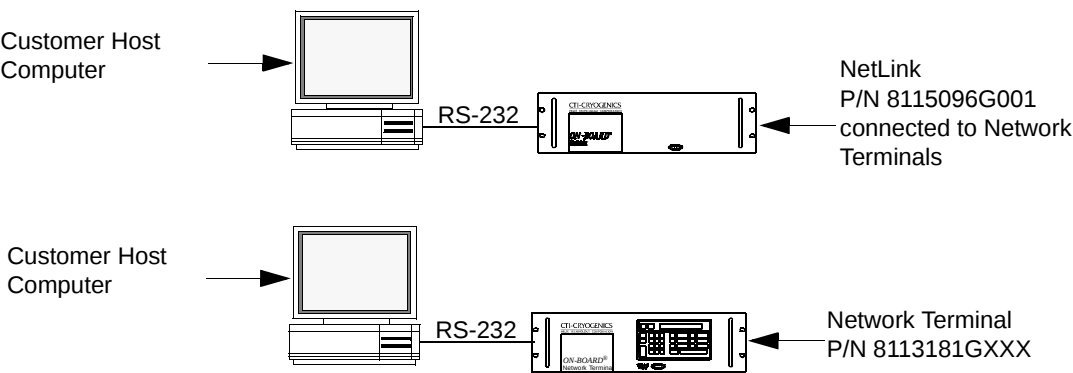
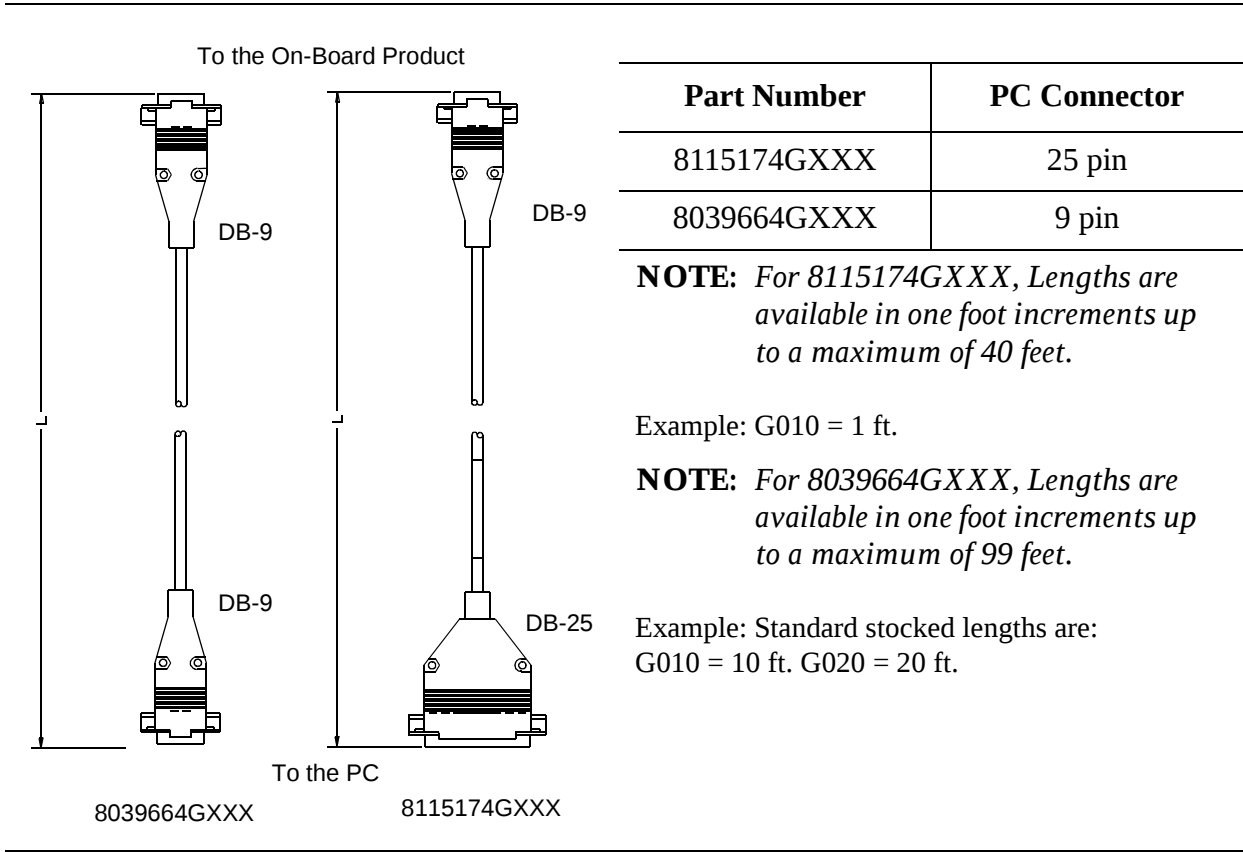
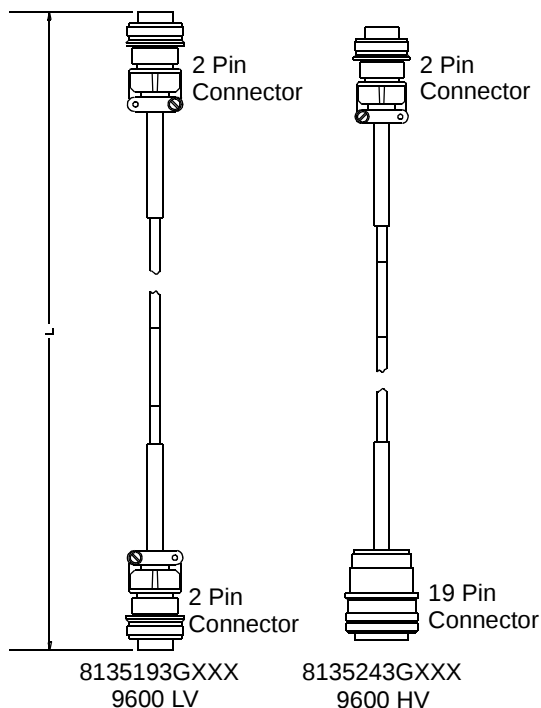


Figure 4-5: RS-232 Cable Diagram Examples

9600 Remote Cable

The 9600 Remote cable connects to the remote connector on the 9600 Compressor and the Cryo-Torr Interface as shown in [Figure 4-6](#). The cable provides the signal to turn the compressor ON or OFF when the customer's vacuum system sends the appropriate signal.



Part Number	Overall Length
8135193GXXX 9600 LV	Order from 1 to 99 feet
8135243GXXX 9600 HV	Order from 1 to 99 feet

NOTE: Lengths are available in one foot increments up to a maximum of 99 feet.

Example: Standard stocked lengths are:
G100 = 10 ft. G200 = 20 ft.

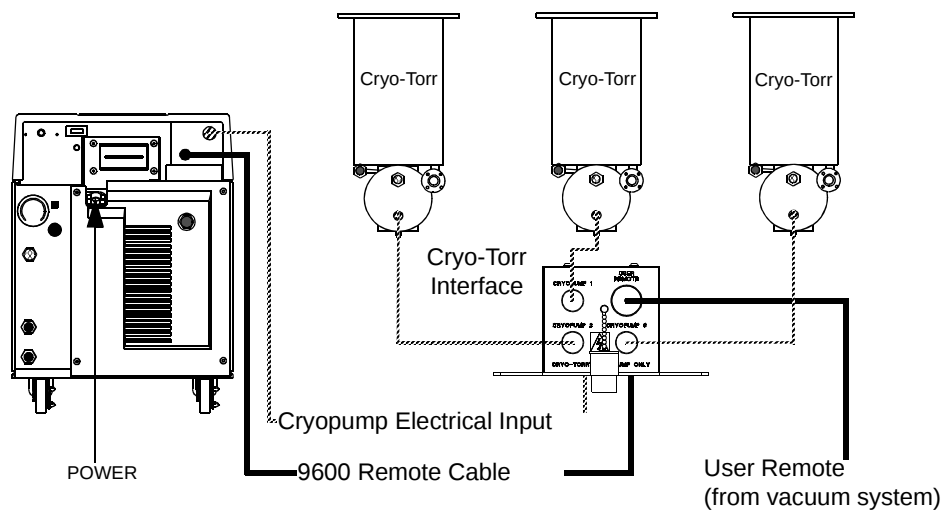
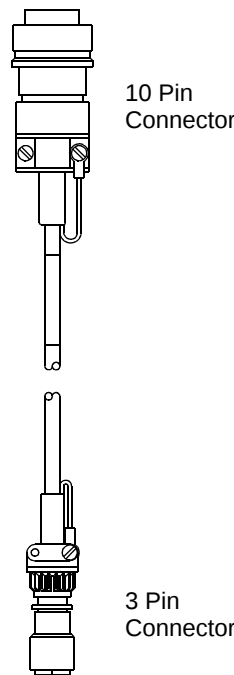


Figure 4-6: 9600 Remote Cable Diagram Example

On-Board Adapter Cable

The On-Board Adapter cable provides power to a Cryo-Torr Cryopump from an On-Board CTI-Cryogenics compressor or other On-Board device.



Part Number	Overall Length
8112212GXXX	Order from 10 to 150 feet

NOTE: *Lengths are available in ten foot increments up to a maximum of 150 feet.*

Example: Standard stocked lengths are:
G001 = 10 ft. G002 = 20 ft.

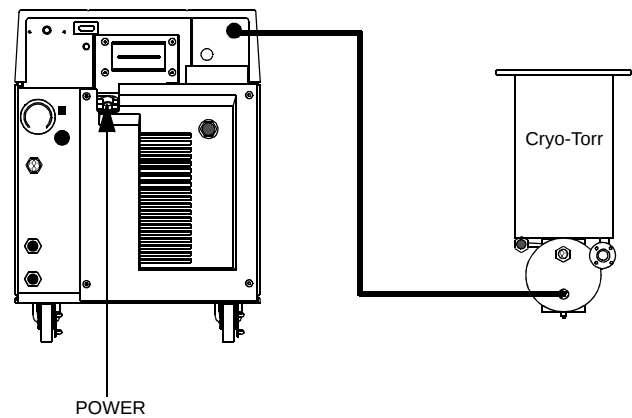


Figure 4-7: On-Board Adapter Cable Diagram Example

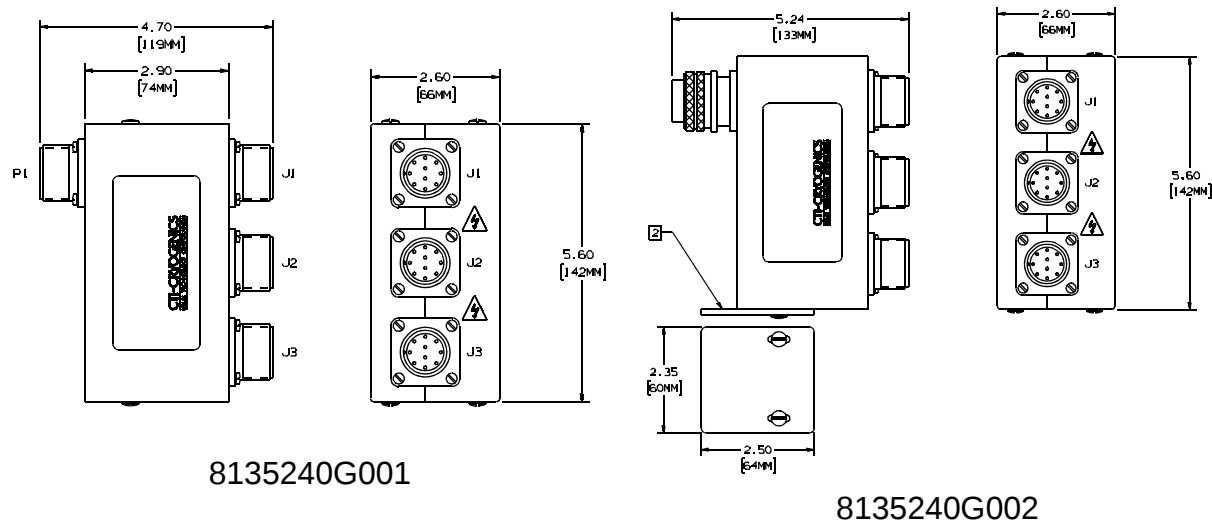
5 Installation Interface Devices

Overview

Section 5 provides information on three installation interface devices; the On-Board Splitter Box, Cryo-Torr 3-Way Power Junction Box, and the Cryo-Torr Interface. These devices allow multiple respective cryopumps to be connected to a compressor as shown in Figures 5-1, 5-2, and 5-3.

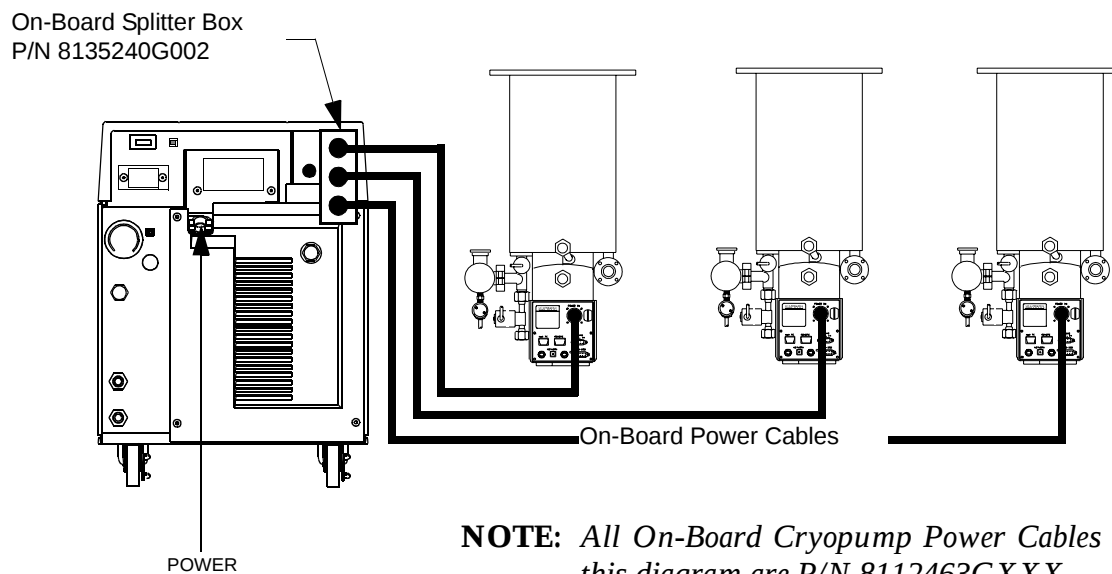
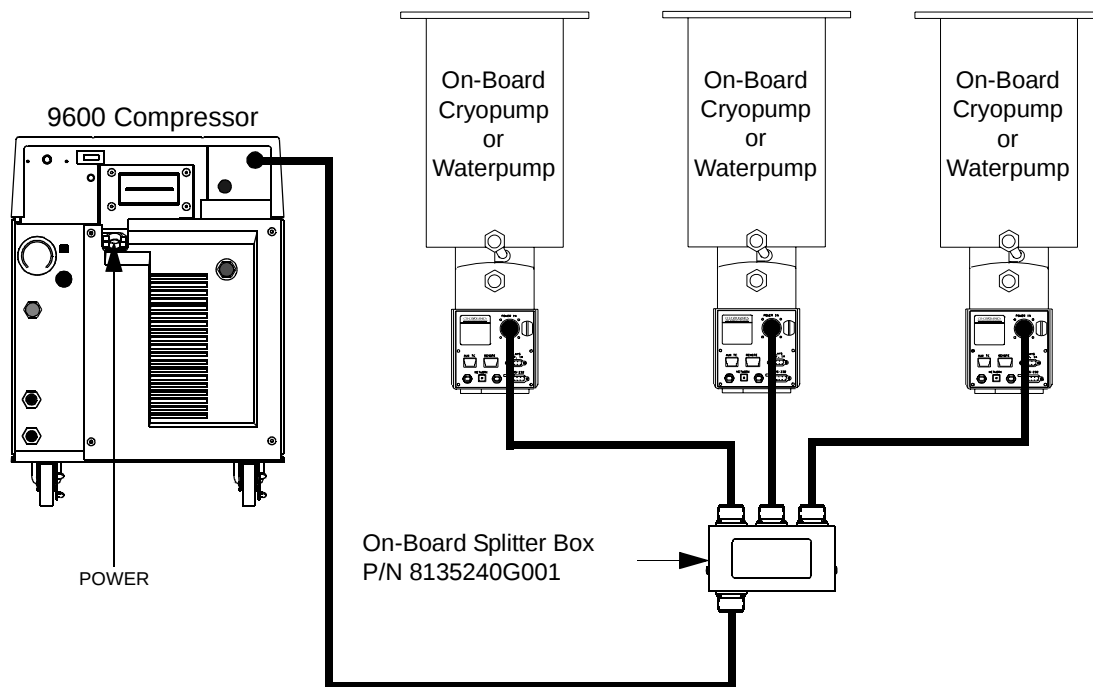
Chapter Contents

On-Board Splitter Box



Part Number
8135240G001
8135240G002

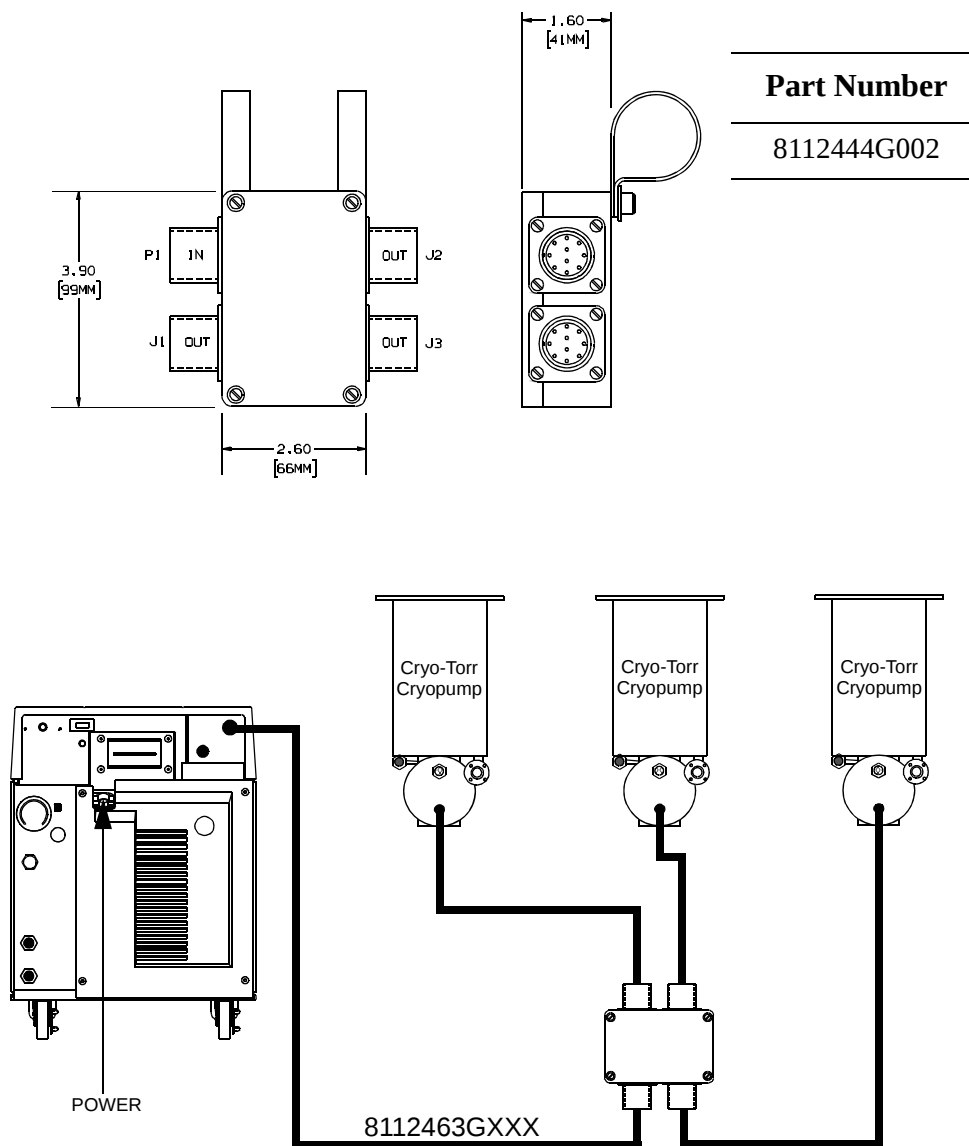
NOTE: The 8135240G002 On-Board Splitter Box mounts to the rear of the compressor as shown in [Figure 5-1](#). This configuration allows a customer with an 8510 Compressor to upgrade to a 9600 Compressor.



NOTE: All On-Board Cryopump Power Cables in this diagram are P/N 8112463GXXX

Figure 5-1: On-Board Splitter Box Applications

Cryo-Torr 3-Way Power Junction Box



NOTE: This is not the preferred installation because the compressor must be turned OFF in order to regenerate the Cryo-Torr Cryopumps.

NOTE: Power Cables from the junction box to the Cryopumps are P/N 8112212GXXX.

Figure 5-2: Typical Cryo-Torr 3-Way Power Junction Box Application

Cryo-Torr Interface

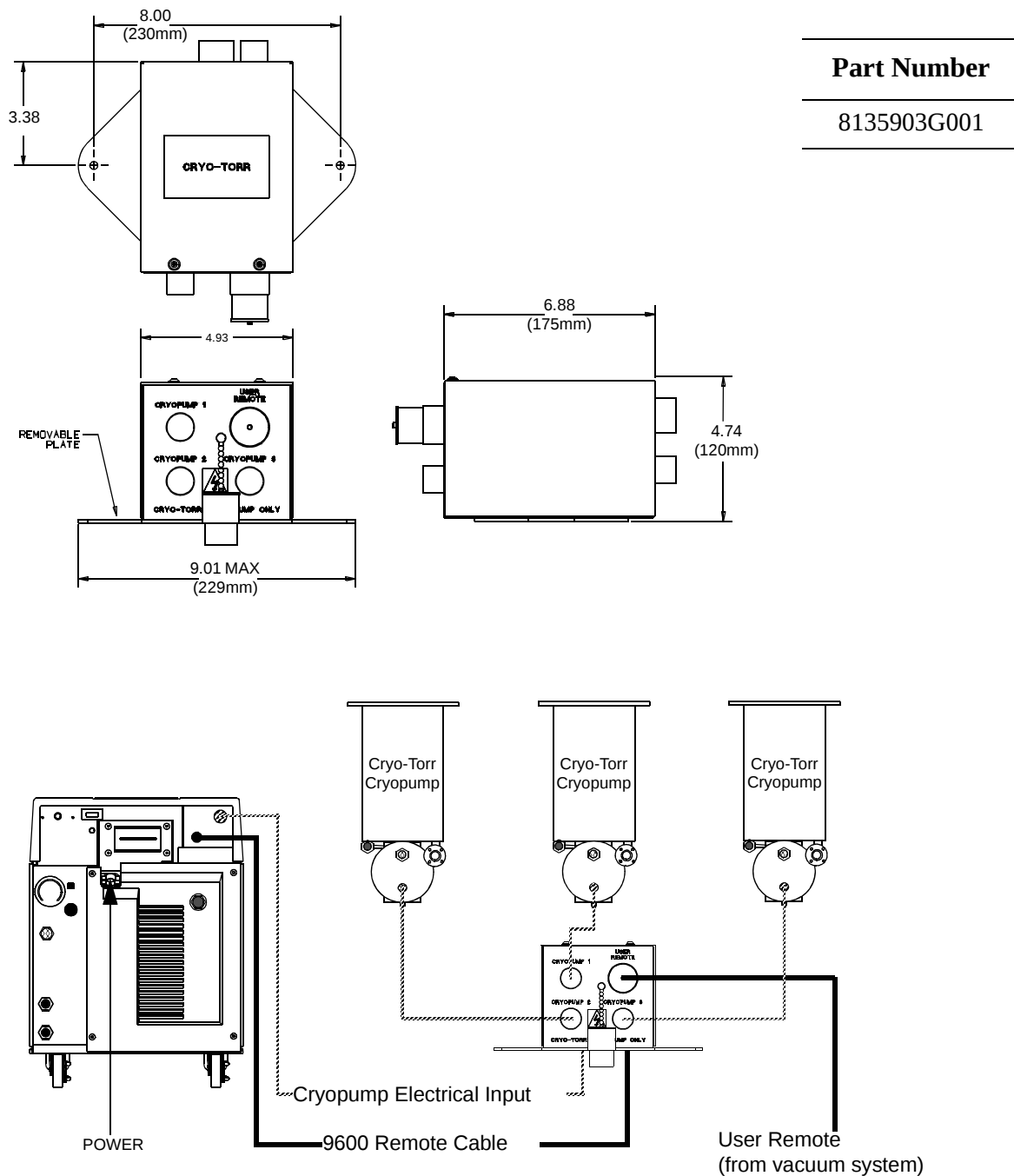


Figure 5-3: Typical Cryo-Torr Interface Application

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Appendices

Overview

The following appendices are included to provide the user with a single location for specific information related to the Brooks Automation Product.

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Appendix A: Customer Support Information

Customer Support Center Locations

To locate a Customer Support Center near you, please visit our website ***www.brooks.com*** on the world wide web and select *CONTACT* on the home page.

Guaranteed Up-Time Support (GUTS®)

For 24-hour, 7-day per week Guaranteed Up-Time Support (GUTS) dial:

1 800-367-4887 - Inside the United States of America

+1 508-337-5599 - Outside the United States of America

Product Information

Please have the following information available when calling so that we may assist you:

- Product Part Number
- Product Serial Number
- Product Application
- Specific Problem Area
- Hours of Operation
- Equipment Type
- Vacuum System Brand / Model / Date of Manufacture

E-mail

For your convenience, you may also e-mail us at:

techsupport@brooks.com

Appendix B: Compressor Specifications

Table 6-1: Maximum Number of Pumps per Compressor

# of Pumps	Pump Configuration	Compressor
One	On-Board 4, On-Board 8, Cryo-Torr 8 Cryopump, On-Board Waterpump / TurboPlus Vacuum Pump (350 refrigerator)	8200
One	On-Board Waterpump (1050 refrigerator)	8200 (3 phase only)
One	On-Board 10, On-Board 400, Cryo-Torr 10, Cryo-Torr 400 Cryopump	8510
One	On-Board 10, On-Board 400, Cryo-Torr 10, Cryo-Torr 400 Cryopumps	9600
One*	On-Board 400, Cryo-Torr 400	9700
Two	On-Board 250, Cryo-Torr 250 Cryopumps	9600
Two	On-Board Waterpumps , TurboPlus Vacuum Pumps (350 refrigerator)	8200 (3 phase only)
Two	On-Board 4, On-Board 8, On-Board 250, Cryo-Torr 8, Cryo-Torr 250 Cryopumps, On-Board Waterpumps (1050 refrigerator)	8510
Two	On-Board 10, Cryo-Torr 10, or one On-Board 10 and one On-Board 8 Cryopump.	9700
Three	On-Board Waterpumps or TurboPlus Vacuum Pumps (350 refrigerator)	8510
Three	On-Board 4, On-Board 8, Cryo-Torr 8 Cryopumps, On-Board Waterpump (350 or 1050 refrigerator)	9600
Three	On-Board In-Situ 1050 Waterpumps or one On-Board 10 and two On-Board 4 Cryopumps (350 refrigerator)	9700
Six	On-Board LowProfile Waterpumps, One On-Board InSitu Waterpumps, or TurboPlus Vacuum Pumps (350 refrigerator)	9700
NOTE: All multi-pump configurations require selection of appropriate interconnection devices. * For Implanter Applications Only.		

Table 6-2: Water Cooled Compressor Input Power Specifications

P/N	Compressor Model	Voltage (VAC)	Frequency (Hz)	Phase	Power (KW)	Customer Circuit Breaker (amps)
8032550G001	8200	180-250	50 / 60	3	2.0	15
8032550G002	8200	180-250	50 / 60	1	2.0	15
8031315	8510	198-250 190-230	60 50	3	5.75	30
8031400G002	8510	395-506 342-457	60 50	3	5.75	20
8135900G001	9600	180-253	50 / 60	3	5.5	30
8135901G001	9600	342-506 342-457	60 / 50	3	5.5	30
8135910G001	9700	200-230 200-230	60 50	3	5.5	30

Table 6-3: Compressor Cooling Water Specifications

P/N	Compressor Model	Temperature Max/Min °F	Flow Rate GPM @ 70° F	Pressure Drop PSID
8032550G001	8200	100 / 40	0.5	2.5
8032550G002	8200	100 / 40	0.5	2.5
8031315	8510	100 / 40	2.5	14
8031400G002	8510	100 / 40	2.5	14
8135900G001	9600	90 / 50 (inlet)	2.75	6.5
8135910G001	9700	90 / 50 (Inlet)	3.0	See 9700 Manual
NOTE: <i>Flowing cooling water colder than 50° F through a non-running compressor can cause start-up problems.</i>				

Table 6-4: Model 8200 Air Cooled Compressor Input Power Specifications

P/N	Voltage (VAC)	Frequency (Hz)	Phase	Power (KW)	Customer Circuit Breaker (amps)	Room Temp. Max/ Min °F
8032549G001	180-250	50 / 60	3	2.0	15	100 / 50
8032549G002	180-250	50 / 60	1	2.0	15	100 / 50

Appendix C: Rough Pump Flow Specifications

Table B-1 provides the minimum rough pump cubic feet per minute (cfm) rating required for performing FastRegen cycles on On-Board Cryopumps.

NOTE: *If the vacuum conductance is unknown, select the next largest rough pumping speed. Regeneration cycle (Fast and Full) time is minimized with a larger rough pump.*

Table 6-5: Rough Pump Flow Data

On-Board Cryopump	Minimum Rough Pump Flow (cfm)
On-Board 4	10
On-Board 8, 8F	10
On-Board 250	17 - 20
On-Board 10, 10F	17 - 20
On-Board 400	35 - 50