Brooks

On-Board IS
Single Stage Cryopump
Operation Manual

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For Technical Support:

Location	GUTS® Contact Number
North America	+1-800-FOR-GUTS (1-800-367-4887) +1-978-262-2900
Europe	+49-1804-CALL-GUTS (+49-1804-2255-4887)
Japan	+81-45-477-5980
China	+86-21-5131-7066
Taiwan	+886-3-5525225
Korea	+82-31-288-2500
Singapore	+65-6464-1481

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January 11, 2013   Part Num 8040731   Revision A

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Printed in the U.S.A.

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1   Safety

Overview

This section describes safety conventions for the Brooks Automation Product. All personnel involved in the operation or maintenance of the product must be familiar with the safety precautions outlined in this section.

NOTE: *These safety recommendations are basic guidelines. If the facility where the Product is installed has additional safety guidelines they should be followed as well, along with the applicable national and international safety codes.*

Chapter Contents

Introduction

Follow all safety precautions during installation, normal operation, and when servicing CTI-Cryogenics products.

This chapter explains the safety conventions used throughout this manual. CTI-Cryogenics uses a specific format for cautions and warnings, which includes standard signal words and safety shapes.

See also the *Customer Support* appendix or call your local Customer Support Center for assistance.

Signal Word Descriptions

All cautions and warnings contain signal words, which call attention to safety messages and designate the degree of hazard seriousness. The following table shows the signal words and their meanings that may be used in this document.

Table 1-1: Safety Signal Words

Term	Example	Definition
CAUTION	**CAUTION**	A signal word that indicates a situation or unsafe practice, which if not avoided may result in **equipment damage**. A CAUTION is highlighted in yellow.
CAUTION	⚠ **CAUTION**	A signal word accompanied by a safety shape that indicates a potentially hazardous situation or unsafe practice. If not avoided, the action may result in **minor or moderate personal injury or equipment damage**. A CAUTION is highlighted in yellow.
WARNING	⚠ **WARNING**	A signal word accompanied by a safety shape that indicates a potentially hazardous situation. If not avoided, the action may result in **serious injury or death**. A WARNING is highlighted in orange.

Safety Shape Descriptions

All cautions and warnings contain safety shapes, which have specific safety meanings. The following table shows some of the safety shapes used in this document and their meanings.

Table 1-2: Safety Shapes

Example	Term	Shape Definition
	General Warning	Indicates a general hazard. Details about this hazard appear in the safety notice explanation.
	High Voltage	Indicates a high voltage hazard.
	Hot Surface	Indicates a surface is hot enough to cause discomfort or a burn.

References

For more information about safety standards, see the following documents:

- ISO 7010: 2003(E), Graphic symbols - Safety colours and safety signs - Safety signs used in workplaces and public areas

- ISO 3864-1: 2002(E), Graphic symbols - Safety colours and safety signs - Part 1: Design principles for safety signs in workplaces and public areas

2 Getting Started

Overview

This section provides the minimum amount of information you need to begin using the Single Stage Cryopump.

For safety information about this product and safety notice conventions in this manual, see Chapter 1: *Safety*.

For details about installation, system parameters, system configuration, and other related information, see 8040730, *On-Board* IS *Single Stage Cryopump Quick Installation Guide*.

Chapter Contents

Identify Single Stage Cryopumps and Configurations

Although other custom configurations are available, the Low Profile Single Stage Cryopump, used with a turbopump, is addressed in this manual.
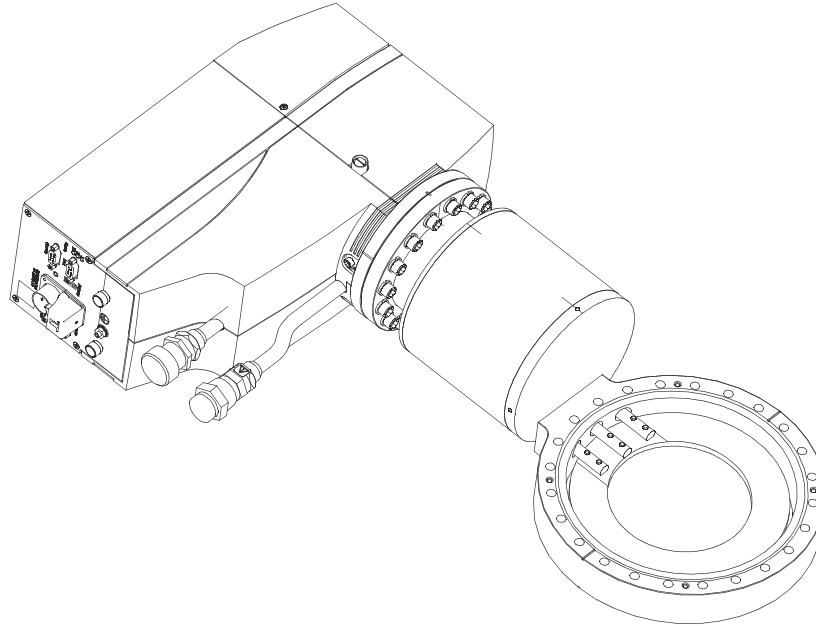
Figure 2-1: Low Profile Single Stage Cryopump

Verify Equipment Installation

Ensure that all On-Board *IS* Cryopump System components are installed and connected to the Intercomponent Network before operating the process tool.

- On-Board *IS* Cryopumps

    Use the appropriate ***On-Board* IS *Cryopump Quick Installation Guide*** included with each cryopump.

- On-Board *IS* 1000 Compressors

    Use the directions found in the ***On-Board IS 1000 Compressor Quick Installation Guide*** included with each compressor.

- On-Board *IS* Controller

    Use the directions found in either the *Rack Mount* or *Pump Mount* ***On-Board* IS *Controller Quick Installation Guide*** included with the Controller.

- On-Board *IS* Remote

    Use the directions found in the ***On-Board* IS *Remote Quick Installation Guide***, included with the Remote keypad.

    NOTE: *Not all systems include a Remote. See 8040677,* On-Board *IS* Cryopump System Command Set Reference *to control the system through the RS-232 interface.*

Set the Intercomponent Network Addresses

The Intercomponent Network contains three channels; A, B and C. After you properly install the system components (cryopumps, compressors, and other parts of the system), set the respective network address for each system component.

See Figure 2-2 for an example of a typical intercomponent system network.

To ensure the network communication does not fail, install a network terminator in the network cable connector on the last Single Stage Cryopump and Compressor on each network channel, if it is not already installed.
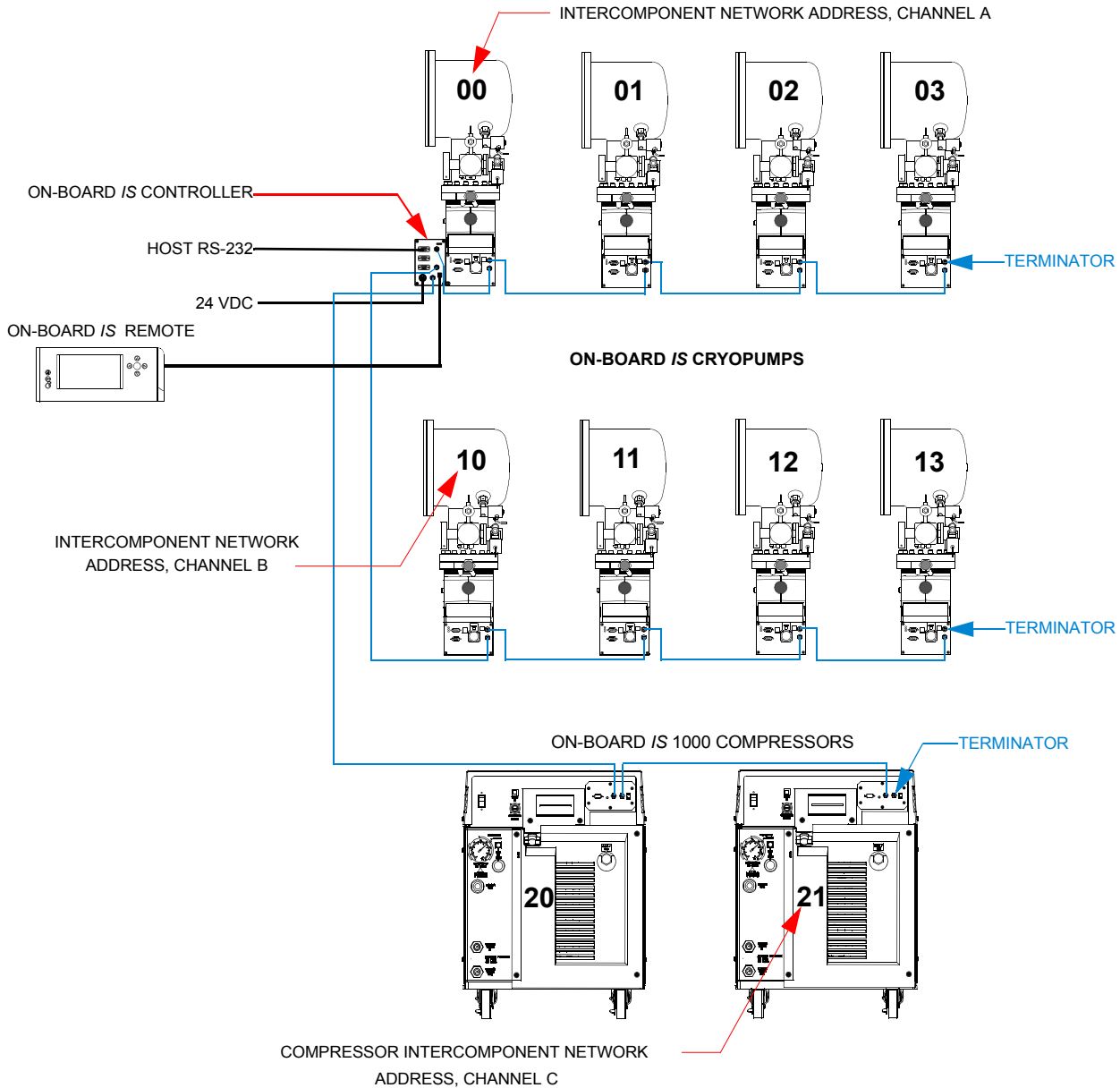
Figure 2-2: Typical Intercomponent Network

On-Board *IS* Cryopump Addresses

NOTE: *If you set the first Channel B address to 0, it appears as 10 on the Remote keypad.*
If you set the first Channel C address to 0, it appears as 20 on the Remote keypad.

1. Set the address switch for each On-Board *IS* Cryopump on channel A to the appropriate network address as shown in Figure 2-2, with the address switch in Figure 2-3.

2. Set the address switch for each On-Board *IS* Cryopump on channel B to the appropriate network address as shown in Figure 2-2, with the address switch in Figure 2-3.
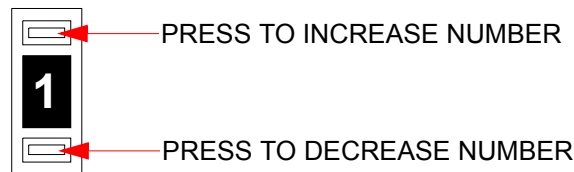
Figure 2-3: Network Address Switch for Single Stage Cryopumps

NOTE: *Other types of cryopumps have two address switches. See the appropriate On-Board* IS *Cryopump Quick Installation Guide or Operation Guide for the cryopump.*

3. Note the address of the Single Stage Cryopump for future use.

On-Board *IS* 1000 Compressor Addresses

NOTE: *If you set the first Channel C address to 0, it appears as 20 on the Remote keypad.*

Set the address switch for each Compressor on channel C to the appropriate network address as shown in Figure 2-2, with the address switch in Figure 2-4.
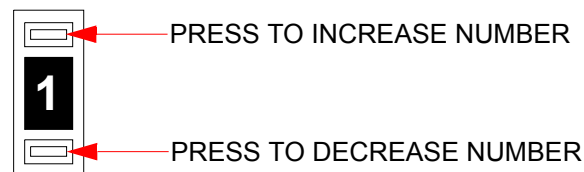
Figure 2-4: Compressor Network Address Switch

Apply Power to the System

After you set the network addresses, turn power ON by doing the following:

1. Close all process chamber Hi-Vac valves, if applicable to your system.

2. Set the Compressor System Circuit Breaker to the **ON** (UP) position.

3. Set the Compressor Control Circuit Breaker to the **ON** (UP) position.

4. Set the power switch on the front panel of the Compressors to the **ON** position.

The system now has power.

Verify Cryopump and Compressor Recognition

After you set the network addresses and apply power to the system, verify the network recognizes all system components (cryopumps, compressors, and other parts of the system) by performing the steps in this section with the On-Board *IS* Remote keypad (Remote).

For details about using the Remote, see .

If you do not use the Remote, see 8040677, *On-Board* IS *Cryopump System Command Set Reference* to control the system through the RS-232 interface.

To verify the system recognizes the cryopump and compressors:

1. Plug in the On-Board *IS* Remote keypad to the On-Board *IS* Controller (Controller) for the system.

   See the *On-Board* IS *Remote Quick Installation Guide* for rack and pump mount Controller details.

   The *On-Board* IS *Controller* main screen appears.

```
      ON-BOARD
      IS CONTROLLER

      Monitor
      Regeneration
    ► Access Device
      System Setup
      Controller Info
```

Figure 2-5: Controller Main Screen

2. From the *On-Board* IS *Controller* main screen, select *Access Device*.

   The *Choose Device* screen appears.

```
┌─────────────────────────────────┐
│                                 │
│         CHOOSE DEVICE           │
│                                 │
│                                 │
│    ► Pumps           8          │
│      Compressors     2          │
│                                 │
│                                 │
│                                 │
│                                 │
└─────────────────────────────────┘
```

Figure 2-6: Choose Device Screen

3.   Note the number of cryopumps (*Pumps*) and compressors that are recognized by the Controller, and ensure this equals the number of components on the system.

If the number of components on the system does not equal the number in the *Choose Device* screen, check the system installation.

If the number of components on the system equals the number in the *Choose Device* screen, you can configure the Rough and Helium Maps.

Configure Accessories for the Cryopump

After you verify the network recognizes all system components, you must configure the cryopump to include the appropriate accessories, which may include a TC gauge, purge valve, rough valve, combinations of these, or no accessories. Use the Remote keypad to to perform the steps in this section.

For assistance with your system accessories, see Appendix A: Customer Brooks Automation Technical Support Information on page 8-2.

For details about using the Remote keypad, see Using the On-Board IS Remote Keypad on page 4-2.

If you do not use the Remote keypad, see 8040677, *On-Board* IS *Cryopump System Command Set* to control the system through the RS-232 interface.

To configure the accessories for the cryopump:

1. Go to the main On-Board *IS* Cryopump screen on the Remote keypad.

```
ON-BOARD IS CRYOPUMP

     Monitor
     Regeneration
   ▶ System Setup
     Control
     Pump Info
```
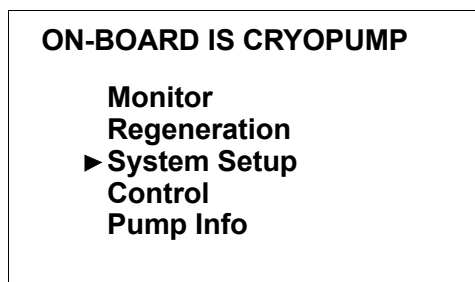
Figure 2-7: Cryopump Main Screen

If the Remote is plugged into the Controller, see Open a Remote Session from the Controller on page 4-5 to get to this screen.

2.   Choose *System Setup* and press *Enter*.

The *System Setup* screen appears.

```
┌──────────────────────────────┐
│        SYSTEM SETUP          │
│                              │
│   Regeneration               │
│   Security Config            │
│   Communication              │
│   Power Failure              │
│ ▶ Pump Configuration         │
│   Display Setup              │
└──────────────────────────────┘
```
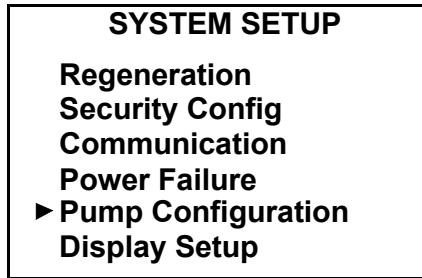
Figure 2-8: System Setup Screen

3.   Choose *Pump Configuration* and press *Enter*.

```
┌──────────────────────────────┐
│ SELECT CONFIGURATION         │
│ ▶ ☐ No Accessories           │
│   ☐ TC Gauge                 │
│   ☐ Purge Valve              │
│   ☐ Rough Valve + TC         │
│   ☐ Pruge Valve + TC         │
│   ☐ Purge + Rough + TC       │
│            ENTER             │
└──────────────────────────────┘
```
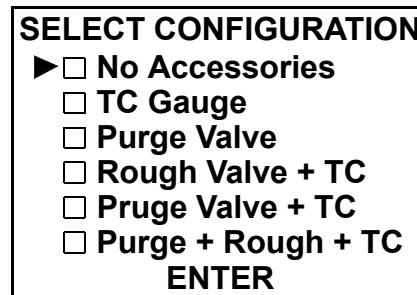
Figure 2-9: Pump Cnfiguration Screen

4.   Use the arrow keys on the Remote keypad to move the cursor to the accessory or accessory combination you want to select, and then press *Enter*.

The box to the left of the accessory or combination becomes shaded.

```
┌──────────────────────────────┐
│ SELECT CONFIGURATION         │
│   ☐ No Accessories           │
│   ☐ TC Gauge                 │
│   ☐ Purge Valve              │
│ ▶ ■ Rough Valve + TC         │
│   ☐ Pruge Valve + TC         │
│   ☐ Purge + Rough + TC       │
│            ENTER             │
└──────────────────────────────┘
```
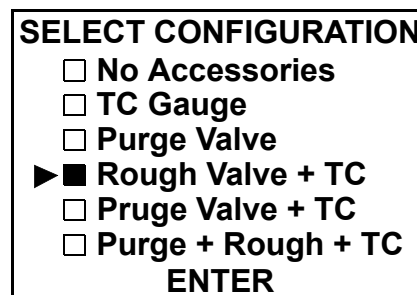
Figure 2-10: Select Accessories

5.   Use the arrow keys to move the cursor to *Enter*, and then press *Enter* on the Remote keypad.

The system is configured for the accessories you chose.

Configure the Rough, Helium, and Regeneration Maps

Choose the system components to add to each rough map and helium map in the Configuring Maps chapter, and regeneration map in the Using the Single Stage Cryopump chapter.

Set the Power Fail Recovery System

After you configure the Rough, Helium, and Regeneration Maps, you must set the Power Failure Recovery (PFR) system. Use the Remote keypad to perform the steps in this section.

For details about using the Remote keypad, see Using the On-Board IS Remote Keypad on page 4-2.

If you do not use the Remote keypad, see 8040677, *On-Board* IS *Cryopump System Command Set* to control the system through the RS-232 interface.

To set the PFR system for the cryopump:

1.   Go to the main On-Board *IS* Cryopump screen on the Remote keypad.

```
ON-BOARD IS CRYOPUMP

    Monitor
    Regeneration
  ▶ System Setup
    Control
    Pump Info
```
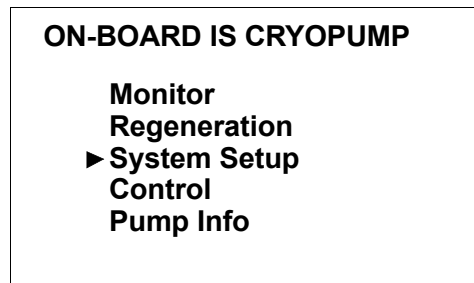
Figure 2-11: Cryopump Main Screen

If the Remote is plugged into the Controller, see Open a Remote Session from the Controller on page 4-5 to get to this screen.

2.   Choose *System Setup* and press *Enter*.

The *System Setup* screen appears.

```
SYSTEM SETUP

    Regeneration
    Security Config
    Communication
  ▶ Power Failure
    Pump Configuration
    Display Setup
```
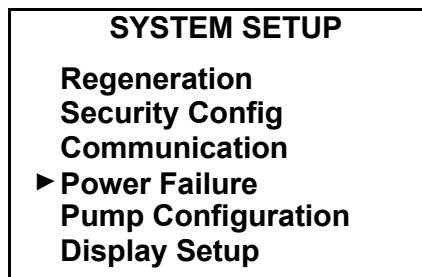
Figure 2-12: System Setup Screen

3.   Choose *Power Failure* and press *Enter*.

      The *Power Failure* screen appears.

```
┌─────────────────────────────┐
│   POWER FAILURE             │
│                             │
│  Recovery          ON       │
│  Temperature (K)   260      │
│                             │
│                             │
│                             │
└─────────────────────────────┘
```
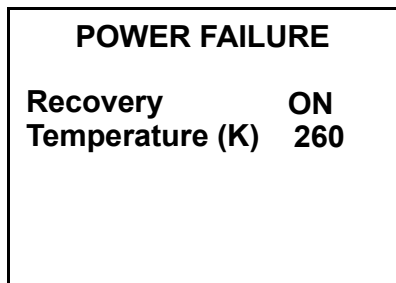
Figure 2-13: Power Failure Screen

4.   Use the arrows keys to change the *Recovery* (mode) and *Temperature* value, if
      you do not want to keep the defaults.

      See Power Failure Recovery Parameters on page 5-12 for more information
      about these settings.

The PFR system is now set.

Startup the Single Stage Cryopump

With the Remote, go to the Startup screen. See Startup the Single Stage Cryopump on page 4-11 for specific instructions.

For details about using the Remote, see Using the On-Board IS Remote Keypad on page 4-2.

If you do not use the Remote, see 8040677, *On-Board* IS *Cryopump System Command Set* to control the system through the RS-232 interface.

3   Configuring Maps

Overview

This chapter describes setting and maintaining rough and helium maps. For information about regeneration maps, see Perform a Group Full Regeneration on page 4-27.

Chapter Contents

About Maps

A map manages each cryopump or compressor on rough or helium manifolds, so that the system operates efficiently during regeneration.

If your system has more than one rough or helium manifold, then you can use more than one rough or helium map. You may use up to five maps on a multiple On-Board *IS* System.

You can configure maps by adding (assigning) cryopumps and compressors, as appropriate, to different maps or removing them from the maps. See the following sections for more formation about map types and how to configure them.

There are three basic map types:

- Rough maps for managing when cryopumps use rough manifolds. See About Rough Maps on page 3-3.

- Helium maps for managing when cryopumps use each compressor. See About Helium Maps on page 3-9.

- Regeneration maps for managing a Group Regeneration. See Perform a Group Full Regeneration on page 4-27.

About Rough Maps

Through a rough map, the On-Board *IS* Controller manages when each cryopump uses a shared rough manifold and rough pump. Each On-Board *IS* System may contain up to five rough maps. See the following figure for an example of cryopumps grouped together by their corresponding rough pumps.

Figure 3-1: Rough Map Configuration Example

NOTE: **If the address is set to 0, it appears as 10 on Channel B.*
**If the address is set to 0, it appears as 20 on Channel C.

View Rough Maps

Before you change the configuration of cryopumps for a rough map, you can see its rough map.

NOTE: *If you are creating rough maps, follow the steps in Configure Rough Maps on page 3-6.*

After you assign a cryopump to a rough map, rough coordination turns on automatically.

1.   Ensure the Remote keypad is plugged into the Controller, to which the cryopumps are attached.

2.   Go to the *On-Board* IS *Controller* screen.

```
┌─────────────────────────────┐
│        ON-BOARD             │
│      IS CONTROLLER          │
│                             │
│    ► Monitor                │
│      Regeneration           │
│      Access Device          │
│      System Setup           │
│      Controller Info        │
│                             │
└─────────────────────────────┘
```

Figure 3-2: On-Board IS *Controller Screen*

3.   Choose *Monitor* and press *Enter*.

The *Monitor Network* screen appears.

```
┌───────────────────────────┐
│   MONITOR NETWORK         │
│                           │
│    Network Status         │
│    Show Devices           │
│  ► Show Regen Setup       │
│    Helium                 │
│                           │
└───────────────────────────┘
```
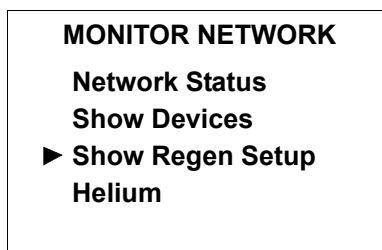
Figure 3-3: Monitor Network Screen

4.   Choose *Show Regen Setup* and press *Enter*.

The *Regeneration* screen appears.

```
┌─────────────────────────────────┐
│   REGENERATION SETUP            │
│                                 │
│   Coordination                  │
│     Full          OFF           │
│     Pwr Fail      OFF           │
│   ▶ Rough Map                   │
│                                 │
└─────────────────────────────────┘
```
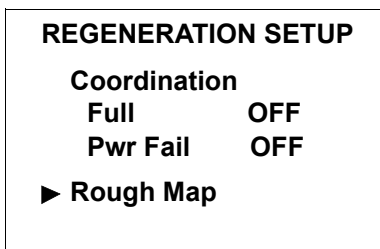
Figure 3-4: Regeneration Screen

5.   Choose *Rough Map* and press *Enter*.

The *Rough Map 1* screen appears.

```
┌─────────────────────────────────┐
│        Rough Map 1              │
│                                 │
│   00     01     02     03       │
│   04     14     17     07       │
│                                 │
│                                 │
│        ▶ Next Map               │
└─────────────────────────────────┘
```

Figure 3-5: Rough Map 1 Screen

6.   Choose *Next Map* and press *Enter* to see Rough Maps 2 through 5, in sequence.

You can use this information to decide which cryopumps to add or remove from each Rough Map as necessary.

Configure Rough Maps

You can configure rough maps by adding or removing cryopumps from them.

NOTE: *After you assign a cryopump to a rough map, rough coordination turns on auto-matically.*

To configure a rough map:

1.   Ensure the Remote keypad is plugged into the Controller, to which the cryopumps are attached.

2.   Note the addresses of the cryopumps that you want to add to a rough map.

3.   Go to the *On-Board* IS *Controller* screen.

```
┌────────────────────────────┐
│        ON-BOARD            │
│      IS CONTROLLER         │
│                            │
│    Monitor                 │
│    Regeneration            │
│    Access Device           │
│  ▶ System Setup            │
│    Controller Info         │
└────────────────────────────┘
```

Figure 3-6: On-Board IS *Controller Screen*

4.   Choose *System Setup* and press *Enter*.

The *System Setup* screen appears.

```
┌────────────────────────────┐
│      SYSTEM SETUP          │
│                            │
│  ▶ Regeneration            │
│    Password                │
│    Communication           │
│    Helium                  │
│    Display Setup           │
└────────────────────────────┘
```

Figure 3-7: System Setup Screen

5.   Choose *Regeneration* and press *Enter*.

The *Regeneration Setup* screen appears.

```
┌──────────────────────────────┐
│  REGENERATION SETUP          │
│                              │
│    Coordination              │
│      Full          OFF       │
│      Pwr Fail      OFF       │
│  ▶ Rough Map        1        │
│                              │
└──────────────────────────────┘
```
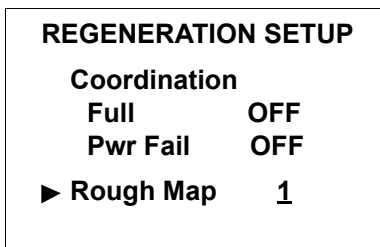
Figure 3-8: Regeneration Setup Screen

NOTE: *You may choose any Rough Map number (up to 5) for configuring cryopumps. Use the arrow buttons on the Remote keypad to enter the Rough Map number you want.*

6.   Choose *Rough Map* and press *Enter*.

The *Rough Map 1* screen appears.

```
┌──────────────────────────────┐
│      ROUGH MAP 1             │
│  ■ 00   ■ 01   ■ 02   ■ 03   │
│  ■ 04   □ 05   □ 06   □ 07   │
│  □ 08   ■ 14   □ 15   □ 16   │
│  ■ 17                        │
│  ▶ ACCEPT CHANGE             │
└──────────────────────────────┘
```

Figure 3-9: Rough Map 1 Screen

7.   Use the Remote keypad arrow buttons to navigate to the address of the cryopumps you want to add or remove from the rough map. Use the *Enter* button to mark the boxes of the cryopump addresses.

8. After you mark the cryopump addresses you want to add or remove from the rough map, navigate to *Accept Change*, and press *Enter*.

The *Verify Rough Map 1* screen appears.

```
┌─────────────────────────────┐
│   VERIFY ROUGH MAP 1        │
│                             │
│   00     01     02     03   │
│                             │
│   04     14     17          │
│                             │
│                             │
│                             │
│ ►ACCEPT CHANGE              │
└─────────────────────────────┘
```

Figure 3-10: Verify Rough Map 1 Screen

This screen shows you the cryopumps that belong to Rough Map 1.

9. If the correct cryopumps are in Rough Map 1, press *Enter*.

If the cryopumps are not correct for Rough Map 1, press *Back*, and then perform Step 7 and Step 9 again.

You have successfully configured a rough map.

About Helium Maps

Through a helium map, the On-Board *IS* Controller manages when each cryopump uses a shared helium manifold and compressor. See Figure 3-11 for cryopumps grouped together by their corresponding compressors.
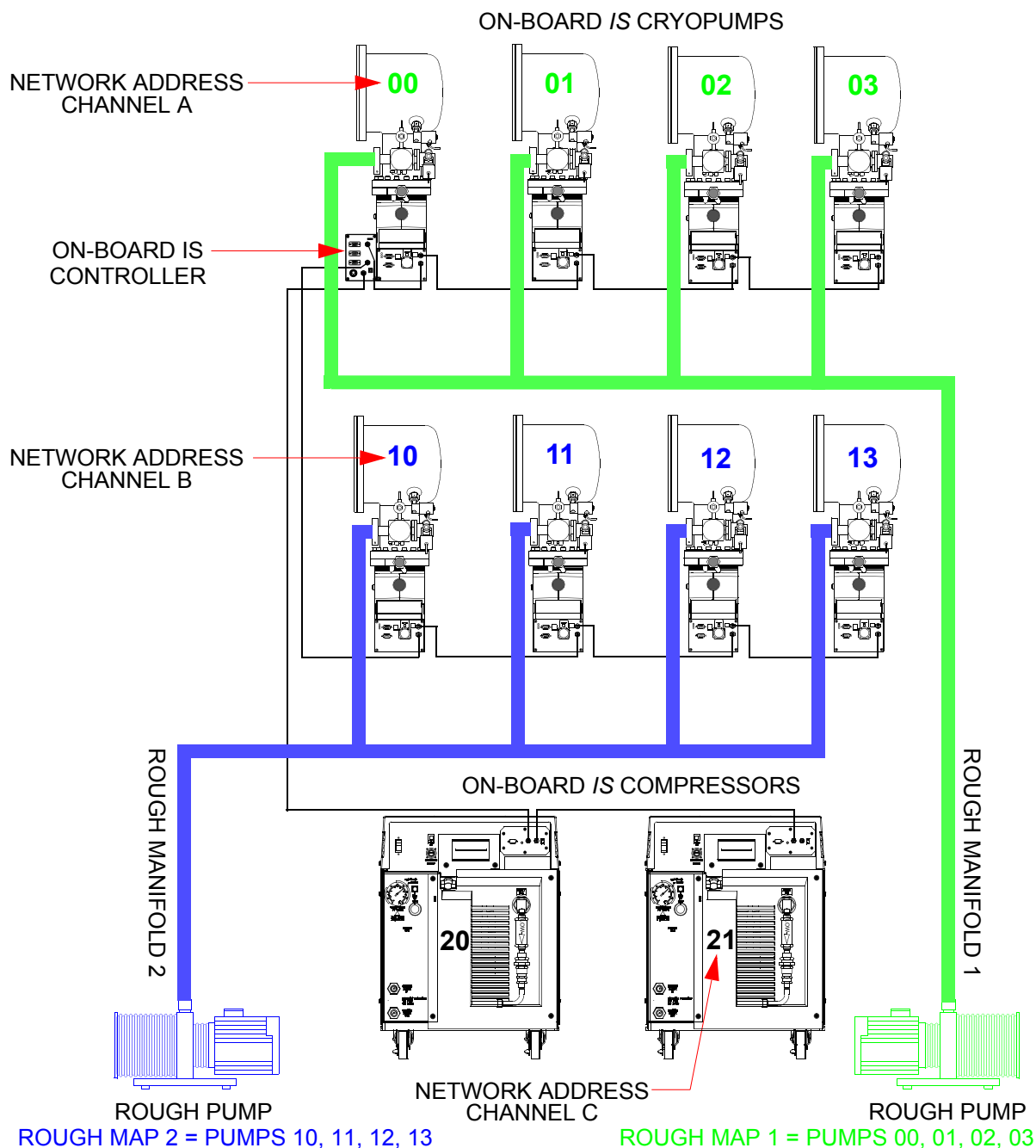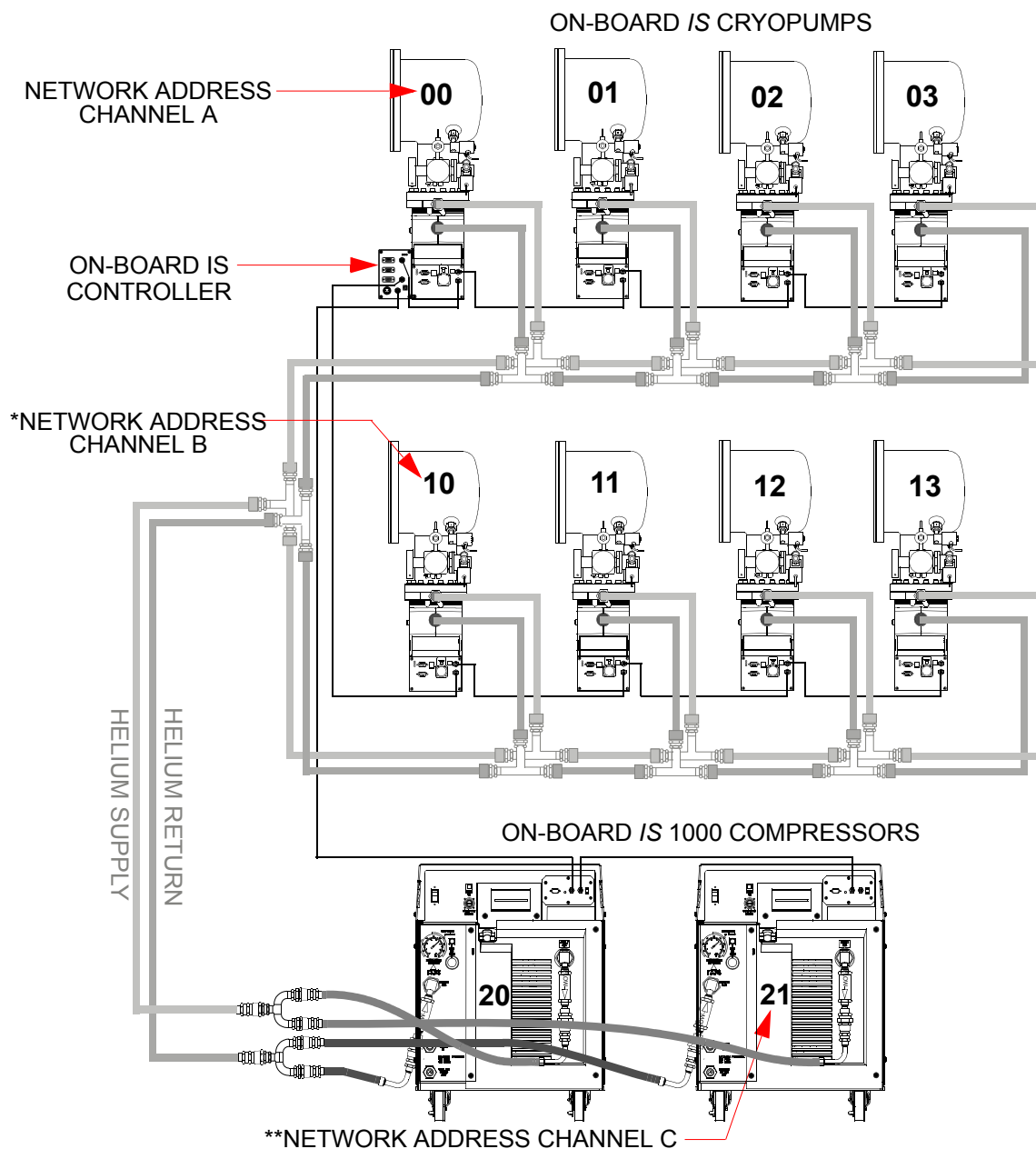

Figure 3-11: Helium Map Configuration Example

NOTE: **If the address is set to 0, it appears as 10 on Channel B.*
**If the address is set to 0, it appears as 20 on Channel C.

View Helium Maps

Before you change the configuration of cryopumps or compressors for a helium map, you can see its helium map.

NOTE: *If you are configuring helium maps, follow the steps in Configure Helium Maps on page 3-12.*

1.   Ensure the Remote keypad is plugged into the Controller, to which the cryopumps are attached.

2.   Go to the *On-Board* IS *Controller* screen.

```
┌─────────────────────────────┐
│        ON-BOARD             │
│       IS CONTROLLER         │
│                             │
│    ► Monitor                │
│      Regeneration           │
│      Access Device          │
│      System Setup           │
│      Controller Info        │
│                             │
└─────────────────────────────┘
```

Figure 3-12: On-Board IS *Controller Screen*

3.   Choose *Monitor* and press *Enter*.

The *Monitor Network* screen appears.

```
┌─────────────────────────────┐
│     MONITOR NETWORK         │
│                             │
│     Network Status          │
│     Show Devices            │
│     Show Regen Setup        │
│   ► Helium                  │
│                             │
└─────────────────────────────┘
```
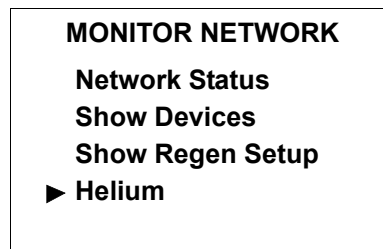
Figure 3-13: Monitor Network Screen

4.   Choose *Helium* and press *Enter*.

The *Helium Management* screen appears.

```
┌─────────────────────────────────┐
│                                 │
│   HELIUM MANAGEMENT             │
│                                 │
│                                 │
│   ► Show Helium Maps            │
│                                 │
│                                 │
│                                 │
└─────────────────────────────────┘
```
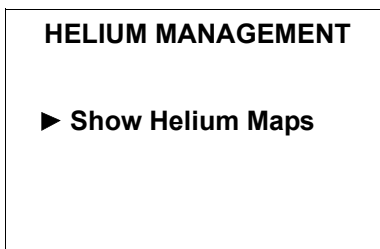
Figure 3-14: Helium Management Screen

5.   Choose *Show Helium Maps* and press *Enter*.

The *Helium Map 1* screen appears.

```
┌─────────────────────────────────┐
│        HELIUM MAP 1             │
│                                 │
│   00    02    04    05          │
│                                 │
│   14    15    16    20          │
│                                 │
│   20                            │
│                                 │
│        ► Next Map               │
└─────────────────────────────────┘
```
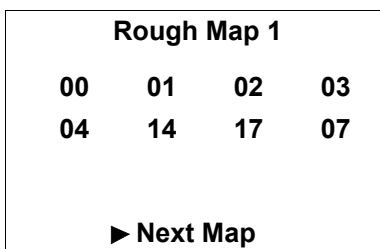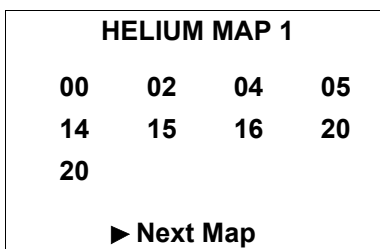
Figure 3-15: Helium Map 1 Screen

6.   Choose *Next Map* and press *Enter* to see Helium Maps 2 through 5, in sequence.

You can use this information to decide which cryopumps and compressors to add or remove from each Helium Map as necessary.

Configure Helium Maps

You can configure helium maps by adding or removing cryopumps and compressors from them.

To configure a helium map:

1. Note the addresses of the cryopumps and compressors that you want to add or remove from a helium map.

2. Ensure the Remote keypad is plugged into the Controller, to which the cryopumps are connected.

3. Go to the *On-Board* IS *Controller* screen.

```
        ON-BOARD
      IS CONTROLLER

      Monitor
      Regeneration
      Access Device
    ► System Setup
      Controller Info
```

Figure 3-16: On-Board IS *Controller Screen*

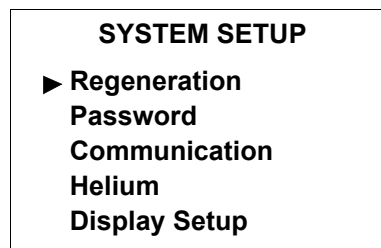4. Choose *System Setup* and press *Enter*.

The *System Setup* screen appears.

```
      SYSTEM SETUP

      Regeneration
      Password
      Communication
    ► Helium
      Display Setup
```
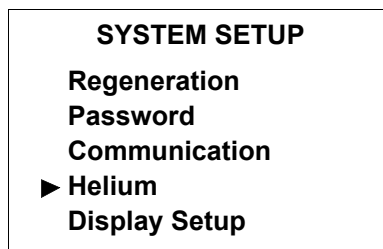
Figure 3-17: System Setup Screen

5.   Choose *Helium* and press *Enter*.

The *Helium* screen appears.

```
┌─────────────────────────────────┐
│            HELIUM               │
│                                 │
│  ► Helium Map      1            │
│                                 │
│                                 │
│                                 │
│                                 │
└─────────────────────────────────┘
```
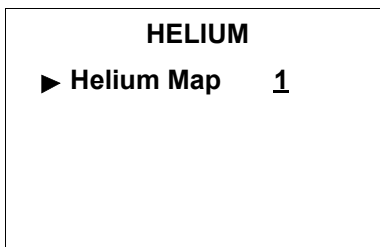
Figure 3-18: Helium Screen

NOTE: *Use the arrow buttons on the Remote keypad to choose any Helium Map number recognized by the system.*

6.   Choose *Helium Map* and press *Enter*.

The *Choose Map Pumps* screen appears.

```
┌─────────────────────────────────┐
│      CHOOSE MAP PUMPS           │
│ ► ■ 00  □ 01  ■ 02  □ 03        │
│   ■ 04  ■ 05  □ 06  □ 07        │
│   □ 08  ■ 14  ■ 15  ■ 16        │
│   □ 17                          │
│       ACCEPT CHANGE             │
└─────────────────────────────────┘
```
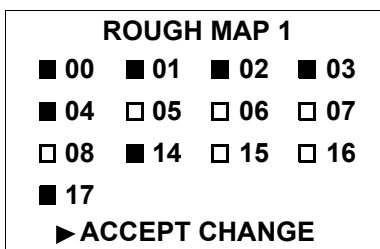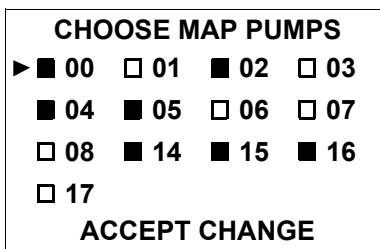
Figure 3-19: Choose Map Pumps Screen

7.   Use the Remote keypad arrow buttons to navigate to the address of the cryopumps you want to add or remove from the helium map. Use the *Enter* button to mark the boxes of the cryopump addresses.

8.   After you mark all the cryopump addresses you want to add tor remove from the helium map, navigate to *Accept Chang*e, and press *Enter*.

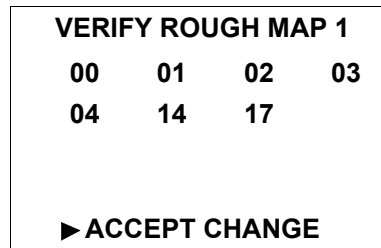The *Choose Compressors* screen appears.

```
┌─────────────────────────────┐
│   CHOOSE COMPRESSORS        │
│ ►■ 20   □ 21   ■ 22         │
│                             │
│                             │
│                             │
│     ACCEPT CHANGE           │
└─────────────────────────────┘
```
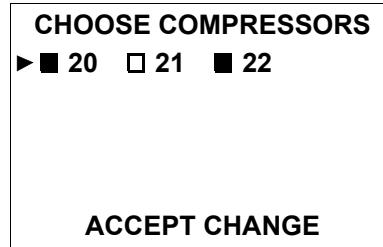
Figure 3-20: Choose Compressors Screen

9.   Use the Remote keypad arrow buttons to navigate to the address of the compressors you want to add or remove from the helium map. Use the *Enter* button to mark the boxes of the compressor addresses.

10.   After you mark all the compressor addresses you want to add or remove from the helium map, navigate to *Accept Chang*e, and press *Enter*.

The *Verify Helium Map 1* screen appears.

```
┌─────────────────────────────┐
│  VERIFY HELIUM MAP 1        │
│  Pumps/Compressors:         │
│  00     02     04     05    │
│  14     15     16           │
│  20     22                  │
│  ►ACCEPT CHANGE             │
└─────────────────────────────┘
```
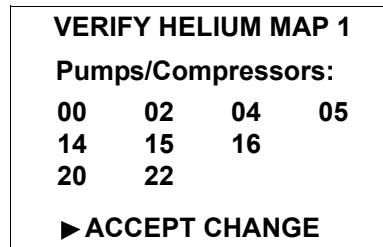
Figure 3-21: Verify Helium Map 1 Screen

This screen shows you the cryopumps and compressors that belong to Helium Map 1.

11.   If the correct cryopumps are in Helium Map 1, press *Enter*.

If the cryopumps and/or the compressors are not correct in Helium Map 1, press *Back*, and then perform Step 7 through Step 11 again.

You have successfully configured a helium map.

4　Using the Single Stage Cryopump

Overview

This chapter explains how to operate the cryopump through the Remote keypad, and when and why you should perform different types of regeneration.

Chapter Contents

Using the On-Board *IS* Remote Keypad

You can use the On-Board *IS* Remote keypad (Remote) to control the cryopump and other system components individually through the component itself, or system-wide through the On-Board *IS* Controller (Controller).

Plug in the Remote to the component you want to use. See the *On-Board* IS *Remote Quick Installation Guide* for rack and pump mount Controller details.

The Remote screen changes as you choose different menu items with the buttons.
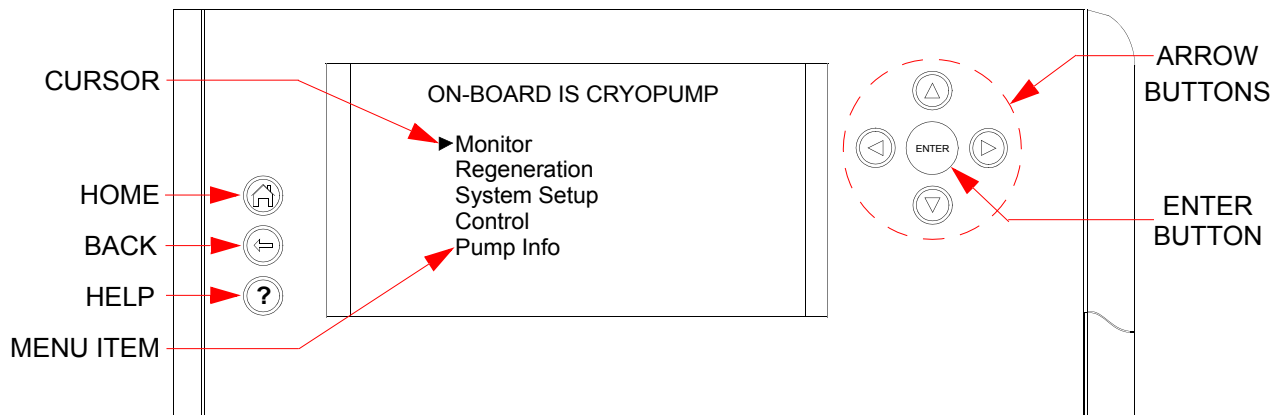
Figure 4-1: On-Board IS *Remote Keypad*

Select Items on the Remote Screen

Select screens and change values the same way for every screen that appears on the Remote (see Figure 4-1).

1.   Use the arrow buttons to move the cursor to an item on the screen.

2.   Press the **ENTER** button to select the item.

        The selected screen appears or the action is completed, as appropriate.

NOTE: *After the Remote is idle for 15 minutes, a screen saver appears, and dims the display to its lowest level of brightness. Press any button on the remote display to turn off the screen saver and return the screen to its normal level of brightness.*

Change Parameters on the Remote

1. Use the arrow buttons to move the cursor (an arrow) to a menu item on the screen.

<div align="center">

SYSTEM SETUP

Regeneration
Security Config
► **Communication**
Power Failure
Pump Configuration
Display Setup

</div>
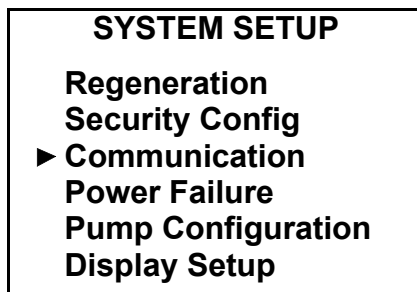
Figure 4-2: Select a Menu Item for a Different Remote Screen

2. Press the **ENTER** button to select the menu item.

   The selected screen appears or the action is completed, as appropriate.

<div align="center">

COMMUNICATION
Set Port Baud Rate

► **Host**   **9600**
   Service   **9600**

</div>
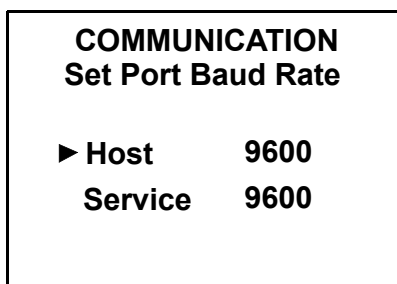
Figure 4-3: Menu Item Screen

3. Use the arrow buttons to move the cursor to the menu item for the value you want to change.

4. Press the **ENTER** button. The value is underlined.

<div align="center">

COMMUNICATION
Set Port Baud Rate

  Host   <u>**9600**</u>
  Service   **9600**

</div>
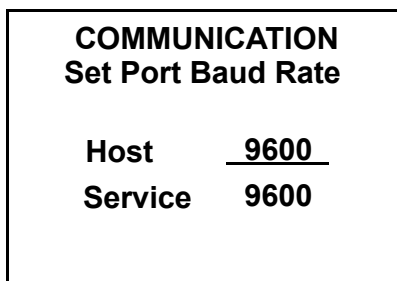
Figure 4-4: Select a Value

5.   Use the arrow buttons to change the value.

In this example, each time you press the up or down arrow buttons, the value changes to 2400, 9600, 19200, or 38400.

```
┌─────────────────────────────┐
│       COMMUNICATION         │
│     Set Port Baud Rate      │
│                             │
│     Host        19200       │
│     Service      9600       │
│                             │
│                             │
└─────────────────────────────┘
```
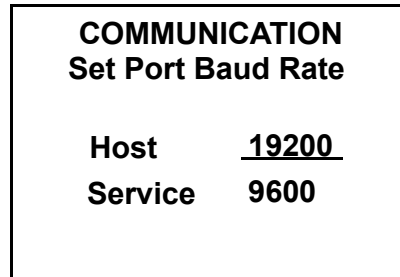
Figure 4-5: Change the Value

6.   Press the **ENTER** button. The value remains at the new value, and the cursor appears to the left of the menu item.

```
┌─────────────────────────────┐
│       COMMUNICATION         │
│     Set Port Baud Rate      │
│                             │
│   ► Host        19200       │
│     Service      9600       │
│                             │
│                             │
└─────────────────────────────┘
```
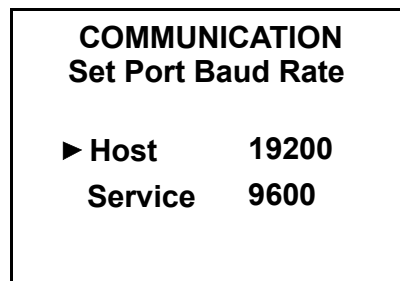
Figure 4-6: New Value is Set

The new value is now set.

NOTE: *After the Remote is idle for 15 minutes, a screen saver appears, and dims the display to its lowest level of brightness. Press any button on the remote display to turn off the screen saver and return the screen to its normal level of brightness.*

Open a Remote Session from the Controller

You can access an individual cryopump through the Controller by opening a Remote Session with the cryopump.

To open a Remote Session from the Controller:

1. Note the network address of the Single Stage Cryopump for which you want to open a Remote Session.

2. Go to the *On-Board* IS *Controller* screen on the Remote keypad.

```
       ON-BOARD
     IS CONTROLLER

     Monitor
     Regeneration
  ►  Access Device
     System Setup
     Controller Info
```

Figure 4-7: On-Board IS *Controller Screen*

3. Choose *Access Device* and press *Enter*.

The *Choose Device* screen appears.

```
     CHOOSE DEVICE

  ► Pumps        12
    Compressors   2
```
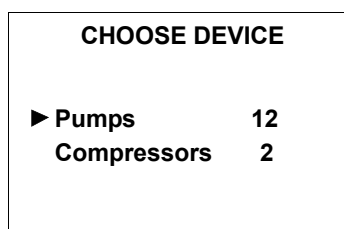
Figure 4-8: Choose Device Screen

4.   Choose *Pumps* and press *Enter*.

The *Network Pumps* screen appears.

```
┌─────────────────────────────┐
│     NETWORK PUMPS           │
│                             │
│  ► 00  01  03  05  06       │
│    07  08  09  10  11       │
│    13  16                   │
│                             │
│                             │
└─────────────────────────────┘
```
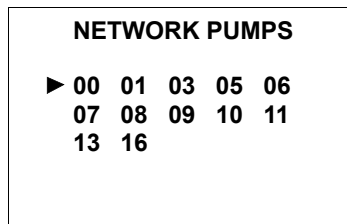
Figure 4-9: Network Pumps Screen

5.   Use the Remote keypad arrows to navigate to the Single Stage Cryopump network address (as noted in Step 1), and press *Enter*.

The *On-Board* IS *Cryopump* screen appears.

```
┌─────────────────────────────┐
│  ON-BOARD IS CRYOPUMP       │
│                             │
│    ► Monitor                │
│      Regeneration           │
│      System Setup           │
│      Control                │
│      Pump Info              │
│                             │
└─────────────────────────────┘
```
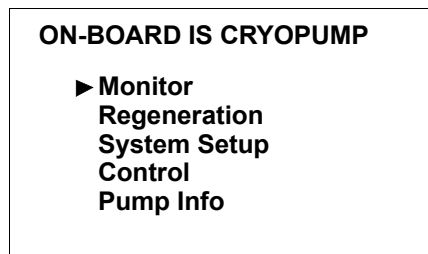
Figure 4-10: On-Board IS *Cryopump Screen*

The Remote Session is now open. You can navigate to all Single Stage Cryopump Remote screens from this one.

Close a Remote Session from the Controller

To the close the Remote Session:

1.   Press the Back button on the Remote keypad until you see the following *Close Remote Session* screen.

```
┌─────────────────────────┐
│CLOSE REMOTE SESSION     │
│                         │
│      Are you sure?      │
│                         │
│           No            │
│        ► Yes            │
│                         │
│                         │
└─────────────────────────┘
```
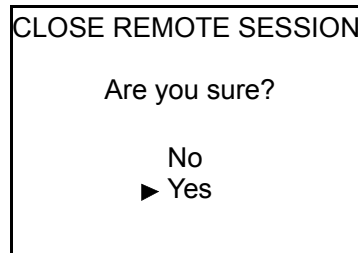
Figure 4-11: Close Remote Session Screen

2.   Choose *Yes*, and press *Enter*.

The Single Stage Cryopump Remote session closes, and you can use the Controller screens for the system again.

About Regeneration and the On-Board *IS* Single Stage Cryopump

The Single Stage Cryopump is a capture pump; it cryogenically condenses gases (creating frost), then warms and eliminates them from the vacuum system during *regeneration*. Typically, you should plan regeneration to coincide with the routine maintenance of a cryopump system, but you can start regeneration any time.

Regeneration incorporates several parameters that are preset at the factory, such as *extended purge* (min.) and *sublime temperature* (K). To change these parameters before regeneration, see Change Regeneration Parameters on page 4-31. For a list of the default regeneration parameters, see Appendix B: Default Parameters (Values) on page 8-3.

	⚠ **WARNING**
⚠ ⚠ ☠	**Toxic Materials** Internal surfaces of the cryopump may contain process-specific toxic or corrosive materials, even after regeneration is complete. Adhere to all safety protocols as appropriate, and avoid touching internal surfaces.

Several different regeneration types exist, such as Startup, Shutdown, Sublime, Warm-up, and others. Use each type to complete a specific task or in a specific situation according to the following definitions.

Sublime Regeneration:
The cryopump stops cooling, stays below atmospheric pressure, warms enough to eliminate the frost that was trapped since the last regeneration, and then cools to the operating temperature.

NOTE: *The cryopump must have a TC gauge to perform a Sublime Regeneration.*

Use a Sublime Regeneration when the Single Stage Cryopump is connected to a turbopump, so that no liquid drips into the turbopump as the cryopump warms.

Timed Sublime:
A type of Sublime Regeneration in which you set the time duration of the regeneration. This is also called a Partial Regeneration.

Use a Timed Sublime Regeneration when you have a short, fixed time during cryopump and system maintenance in the chamber.

NOTE: *Not all of the frost may be eliminated during this time.*

Pressure Sublime:
A type of Sublime Regeneration in which all the frost is removed.

Use a Pressure Sublime Regeneration for most regenerations when the cryopump is connected to a turbopump. See Perform a Regeneration on One Single Stage Cryopump for instructions.

Warmup Regeneration:
The cryopump stops cooling, may go above atmospheric pressure, and warms enough to eliminate the frost that was trapped since the last regeneration. See the Warmup Without and With Cooldown definitions for details about when to use this type. See Perform a Regeneration on One Single Stage Cryopump for instructions, and Change Warmup Regeneration Parameters to set either Warmup Regeneration.

Warmup Without Cooldown:
A type of Warmup Regeneration in which the cryopump remains warm, and does not resume operation.

Use a Warmup Without Cooldown Regeneration when you perform maintenance for an extended time, and the cryopump is not connected to a turbopump. You can also wipe moisture off of the cryopump during this time, if necessary.

Warmup With Cooldown:
A type of Warmup Regeneration in which the cryopump cools down and resumes pumping, after reaching a specific temperature.

Use a Warmup With Cooldown for most regenerations when the cryopump is not connected to a turbopump, and you want to warm it for a specific time period. See the following definition for *Startup*.

Startup:
The cryopump starts a Warmup With Cooldown Regeneration. Use Startup to start the Single Stage Cryopump for the first time or to re-start it after a Shutdown. See Startup the Single Stage Cryopump for instructions.

Shutdown:
The cryopump starts a Pressure Sublime Regeneration. Use Shutdown to stop the cooling and pumping, but hold the cryopump below atmospheric pressure as it warms so that no liquid drips onto other system components, such as a turbopump. After a set time, the cryopump warms to ambient temperature and the motor shuts off. See Shutdown the Single Stage Cryopump for instructions.

Group Full Regeneration:

The system starts a Warmup With Cooldown or a Pressure Sublime, depending upon the last regeneration performed on the cryopump. Use a Group Full Regeneration to coordinate rough manifold sharing (if applicable) for all cryopumps on the system that regenerate at the same time. See Perform a Group Full Regeneration for instructions.

Group Fast Regeneration:

NOTE: _Single Stage Cryopumps are not included in a Group Fast Regeneration._

The system starts a Partial Warmup with Cooldown and coordinates rough pump and purge valve sharing (if applicable) for all cryopumps on the system that regenerate at the same time.

Startup the Single Stage Cryopump

Use the Startup function to start the Single Stage Cryopump for the first time or to re-start it after a Shutdown. The cryopump starts a Warmup With Cooldown Regeneration.

To Startup the cryopump:

1.   Go to the *On-Board* IS *Cryopump* screen on the Remote keypad.

```
ON-BOARD IS CRYOPUMP

    Monitor
    Regeneration
    System Setup
  ▶ Control
    Pump Info
```

Figure 4-12: Cryopump Main Screen

If the Remote is plugged into the Controller, see Open a Remote Session from the Controller on page 4-5 to get to this screen.

2.   Choose *Control* and press *Enter*.

The *Control* screen appears.

```
        CONTROL

  ▶ Pump
    Valves
    Temperature
```

Figure 4-13: Control Screen

3.   Choose *Pump* and press *Enter*.

The *Pump Control* screen appears.

```
┌─────────────────────────────┐
│       PUMP CONTROL          │
│                             │
│  Motor           On         │
│  HFI Status      OK         │
│  ▶ Startup                  │
│  Safe Shutdown              │
│                             │
│                             │
└─────────────────────────────┘
```
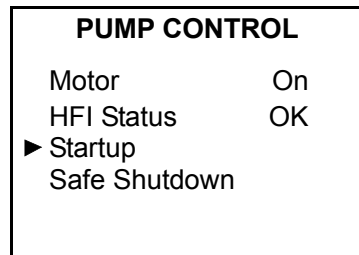
Figure 4-14: Pump Control Screen

4.   Choose *Startup* and press *Enter*.

The *Start a Warmup Regeneration* screen appears.

```
┌─────────────────────────────┐
│      This will start a      │
│    Warmup Regeneration      │
│                             │
│      Do you want to         │
│         proceed?            │
│          No                 │
│        ▶ Yes                │
│                             │
└─────────────────────────────┘
```
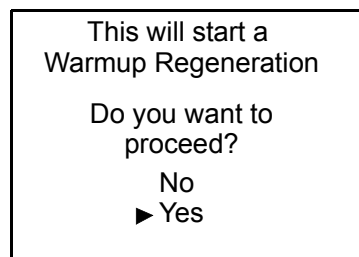
Figure 4-15: Start a Warmup Regeneration Screen

5.   Choose *Yes* and press *Enter*.

The *Regeneration Status* screen appears.

```
┌─────────────────────────────┐
│    REGENERATION STATUS      │
│     Warmup in Progress      │
│                             │
│  Warmup                     │
│    Actual (K)      290      │
│    Target (K)      310      │
│                             │
│         Abort               │
└─────────────────────────────┘
```
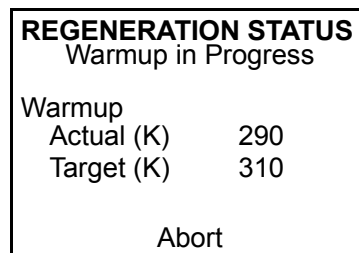
Figure 4-16: Regeneration Status Screen

NOTE: *If the system has a purge valve, the system performs an extended purge before the motor is on and begins cooling.*

The *Actual* temperature will rise until it meets the *Target* temperature, and then the motor begins cooling the cryopump.

The *Regeneration Status* screen shows when Regeneration is finished.

```
REGENERATION STATUS
        IDLE

   Warmup Complete

Pump              ON
Temperature (K)   107
```

Figure 4-17: Regeneration Status Screen

Shutdown the Single Stage Cryopump

Use Shutdown to stop the cooling and pumping, but hold the cryopump below atmospheric pressure (in a Pressure Sublime Regeneration) so that no liquid drips onto other system components, such as a turbopump.

⚠	**CAUTION** **Equipment Damage** To avoid permanently damaging a turbopump connected to the Single Stage Cryopump, ensure that no liquid enters the turbopump. Consult your turbopump instructions about specific safety measures.

NOTE: *The cryopump must have a TC gauge to perform a Shutdown (Sublime Regeneration).*

To Shutdown the cryopump:

1.   Go to the *On-Board* IS *Cryopump* screen on the Remote keypad.

<div style="border:1px solid">

ON-BOARD IS CRYOPUMP

Monitor
Regeneration
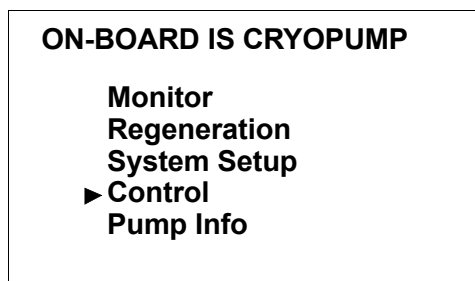**System Setup**
► **Control**
Pump Info

</div>

Figure 4-18: Cryopump Main Screen

If the Remote is plugged into the Controller, see Open a Remote Session from the Controller on page 4-5 to get to this screen.

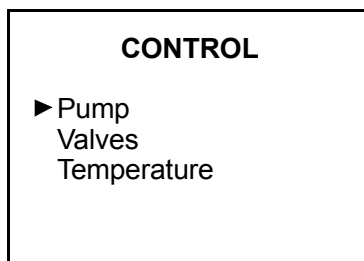2.   Choose *Control* and press *Enter*.

The *Control* screen appears.

```
┌─────────────────────────┐
│        CONTROL          │
│                         │
│     ►Pump               │
│      Valves             │
│      Temperature        │
│                         │
│                         │
└─────────────────────────┘
```

Figure 4-19: Control Screen

3.   Choose *Pump* and press *Enter*.

The *Pump Control* screen appears.

```
┌─────────────────────────┐
│      PUMP CONTROL       │
│                         │
│   Motor          On     │
│   HFI Status     OK     │
│   Startup               │
│   ► Safe Shutdown       │
│                         │
└─────────────────────────┘
```
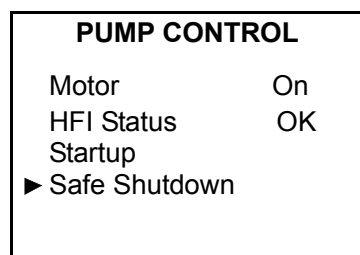
Figure 4-20: Pump Control Screen

4.   Choose *Safe Shutdown* and press *Enter*.

The *Shutdown* screen appears.

```
┌─────────────────────────┐
│        SHUTDOWN         │
│                         │
│    Select Type to Start │
│        ► Sublime        │
│                         │
│                         │
└─────────────────────────┘
```
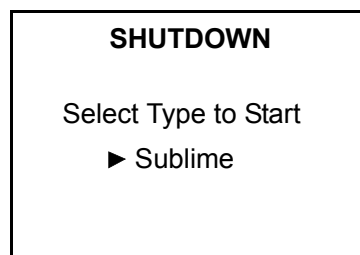
Figure 4-21: Shutdown Screen

5.   Choose *Sublime* and press *Enter*.

The *Start a Sublime* screen appears.

```
┌─────────────────────────┐
│      This will start a  │
│          Sublime.       │
│                         │
│      Do you want to     │
│         proceed?        │
│            No           │
│          ▶ Yes          │
│                         │
└─────────────────────────┘
```
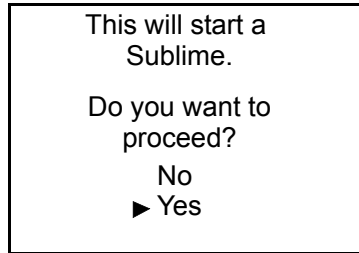
Figure 4-22: Start a Sublime (Shutdown) Screen

6.   Choose *Yes* and press *Enter*.

The *Regeneration Status* screen appears.

```
┌─────────────────────────┐
│   REGENERATION STATUS   │
│    Sublime in Progress  │
│                         │
│   Warmup                │
│      Actual (K)     109 │
│      Target (K)     230 │
│                         │
│            Abort        │
└─────────────────────────┘
```
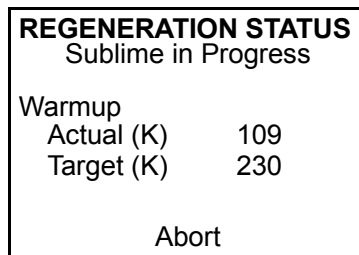
Figure 4-23: Regeneration Status Screen

The *Actual* temperature will rise until it meets the *Target* temperature, and the temperature remains steady until the pressure drops, indicating all the frost sublimated.

The *Regeneration Status* screen shows when Regeneration is finished.

```
┌─────────────────────────┐
│   REGENERATION STATUS   │
│          IDLE           │
│                         │
│     Sublime Complete    │
│                         │
│   Pump            OFF   │
│   Temperature (K)  295  │
│                         │
└─────────────────────────┘
```
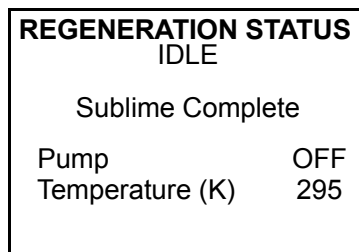
Figure 4-24: Regeneration Status Screen

Perform a Regeneration on One Single Stage Cryopump

You can use a Pressure Sublime Regeneration for most regenerations when the cryopump is connected to a turbopump. See the following section for instructions.

For other situations, you may also use a Warmup Regeneration. See Perform a Warmup Regeneration on page 4-20.

Perform a Pressure Sublime Regeneration

NOTE: *The cryopump must have a TC gauge to perform a Sublime Regeneration.*

To start a Pressure Sublime Regeneration:

1.   Go to the *On-Board* IS *Cryopump* screen on the Remote keypad.

```
┌─────────────────────────────────┐
│  ON-BOARD IS CRYOPUMP           │
│                                  │
│      Monitor                     │
│    ►Regeneration                 │
│      System Setup                │
│      Control                     │
│      Pump Info                   │
│                                  │
└─────────────────────────────────┘
```
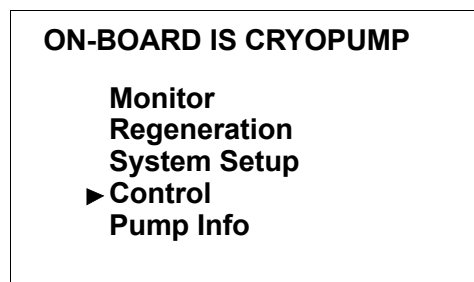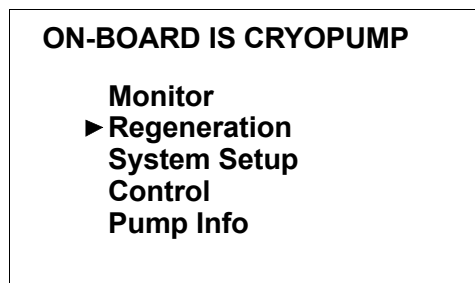
Figure 4-25: Cryopump Main Screen

If the Remote is plugged into the Controller, see Open a Remote Session from the Controller on page 4-5 to get to this screen.

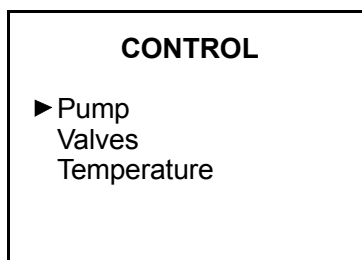2.   Choose *Regeneration* and press *Enter*.

The *Regeneration* screen appears.

```
┌─────────────────────────────────┐
│        REGENERATION             │
│                                  │
│  Select Type to Start           │
│    Warmup                        │
│    ►Pressure Sublime             │
│    Time Sublime                  │
│    Sublime Shutdown              │
│                                  │
└─────────────────────────────────┘
```
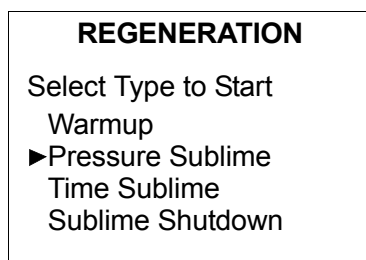
Figure 4-26: Regeneration Screen

3.   Choose *Pressure Sublime* and press *Enter*.

         The *Start Sublime Regen* screen appears.

```
┌────────────────────────────┐
│  START SUBLIME REGEN        │
│                             │
│       Are you sure?         │
│          No                 │
│        ► Yes                │
│                             │
│                             │
│                             │
└────────────────────────────┘
```

Figure 4-27: Start Sublime Regen Screen

4.   Choose *Yes* and press *Enter*.

         The system performs a Pressure Sublime Regeneration, and a *Regeneration Status* screen appears for each regeneration cycle.

NOTE: *Some regeneration cycles may last for two hours or more, depending on your application.*

```
┌────────────────────────────┐
│  REGENERATION STATUS        │
│    Sublime in Progress      │
│                             │
│  Warmup                     │
│    Actual (K)        107    │
│    Target (K)        230    │
│                             │
│        ► Abort              │
└────────────────────────────┘
```
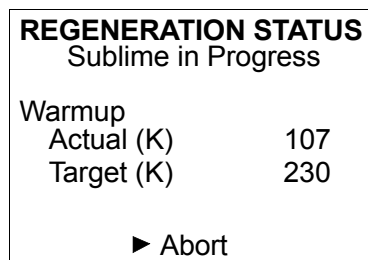
Figure 4-28: Regeneration Status Screen, Warmup Cycle

```
        REGENERATION STATUS
           Sublime in Progress

     Roughing
         Actual (u)           1865
         Target (u)           100


              ► Abort
```
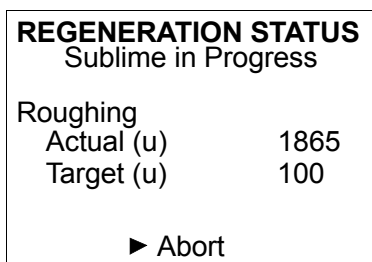
Figure 4-29: Regeneration Status Screen, Rough Cycle

Actual and *Target* values in the previous figure indicate pressure measured in microns.

```
        REGENERATION STATUS
           Sublime in Progress

     Cooldown
         Actual (K)           230
         Target (K)           130


              ► Abort
```

Figure 4-30: Regeneration Status Screen, Cooldown Cycle

The *Regeneration Status* screen shows when Regeneration is finished.

```
        REGENERATION STATUS
               IDLE

           Sublime Complete

     Pump                ON
     Temperature (K)     107
```

Figure 4-31: Regeneration Status Screen

Perform a Warmup Regeneration

To set a *Warmup With* or *Without Cooldown*, see Change Regeneration Parameters on page 4-31.

To start a Warmup Regeneration:

1.   Go to the *On-Board* IS *Cryopump* screen on the Remote keypad.

```
ON-BOARD IS CRYOPUMP

        Monitor
      ▶ Regeneration
        System Setup
        Control
        Pump Info
```

Figure 4-32: Cryopump Main Screen

If the Remote is plugged into the Controller, see Open a Remote Session from the Controller on page 4-5 to get to this screen.

2.   Choose *Regeneration* and press *Enter*.

The *Regeneration* screen appears.

```
        REGENERATION

Select Type to Start
▶Warmup
 Pressure Sublime
 Time Sublime
 Sublime Shutdown
```

Figure 4-33: Regeneration Screen

3.   Choose *Warmup* and press *Enter*.

The *Start Warmup Regen* screen appears.

```
┌─────────────────────────────┐
│  START WARMUP REGEN         │
│                             │
│        Are you sure?        │
│            No               │
│          ► Yes              │
│                             │
│                             │
│                             │
└─────────────────────────────┘
```
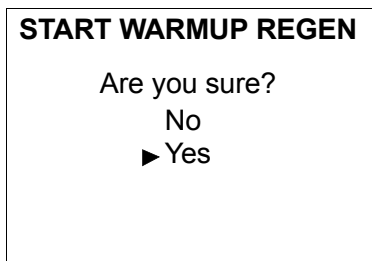
Figure 4-34: Start Warmup Regen Screen

4.   Choose *Yes* and press *Enter*.

The system performs a Warmup Regeneration, and the *Regeneration Status* screen appears.

```
┌─────────────────────────────┐
│  REGENERATION STATUS        │
│    Warmup in Progress       │
│                             │
│  Warmup                     │
│     Actual (K)        105   │
│     Target (K)        230   │
│                             │
│         ► Abort             │
└─────────────────────────────┘
```
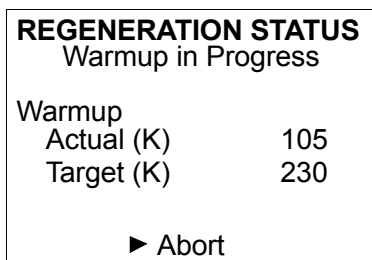
Figure 4-35: Regeneration Status Screen, Warmup Cycle

```
┌─────────────────────────────┐
│  REGENERATION STATUS        │
│    Warmup in Progress       │
│                             │
│  Cooldown                   │
│     Actual (K)        310   │
│     Target (K)        130   │
│                             │
│         ► Abort             │
└─────────────────────────────┘
```
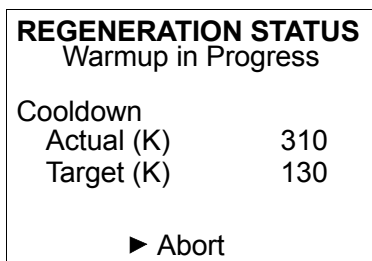
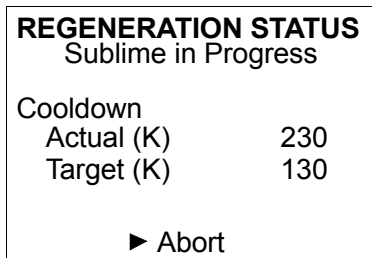*Figure 4-36: Regeneration Status Screen, Cooldown Cycle*

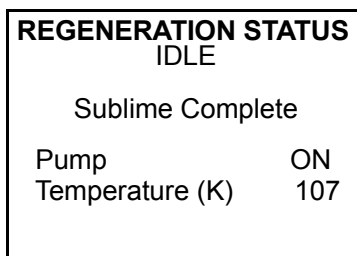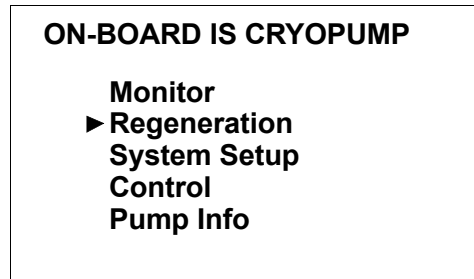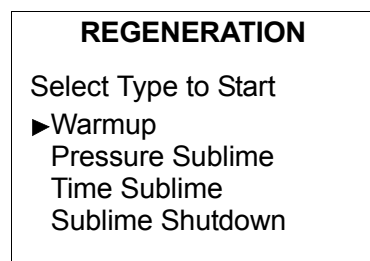The *Regeneration Status* screen shows when Regeneration is finished.

```
┌─────────────────────────┐
│  REGENERATION STATUS    │
│         IDLE            │
│                         │
│     Warmup Complete     │
│                         │
│  Pump            ON     │
│  Temperature (K)  107   │
│                         │
│                         │
└─────────────────────────┘
```

Figure 4-37: Regeneration Status Screen

Set and Start a Timed Sublime Regeneration

Use a Timed Sublime Regeneration when you have a short, fixed time during cryopump and system maintenance in the chamber because you can limit the time for this regeneration by setting the roughing time.
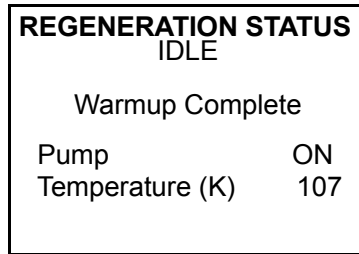
NOTE: *Not all of the frost may sublimate during this time.*

NOTE: *This is also called a* Partial Regeneration.

First, set the sublime time for the Timed Sublime Regeneration (in minutes), and then start the Time Sublime Regeneration.

Set the Sublime Time for the Timed Sublime Regeneration

To set the sublime time:

1.   Go to the *On-Board* IS *Cryopump* screen on the Remote keypad.

```
ON-BOARD IS CRYOPUMP

    Monitor
    Regeneration
  ▶ System Setup
    Control
    Pump Info
```
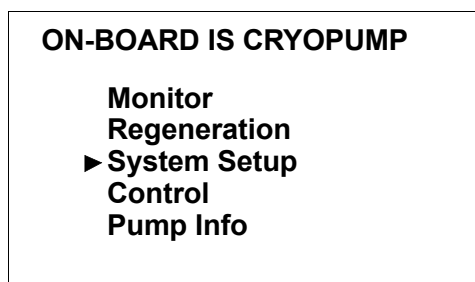
Figure 4-38: Cryopump Main Screen

If the Remote is plugged into the Controller, see Open a Remote Session from the Controller on page 4-5 to get to this screen.

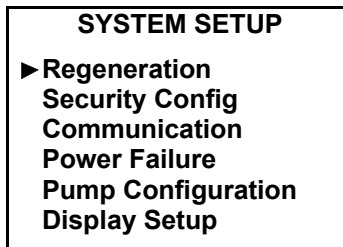2. Choose *System Setup* and press *Enter*.

The *System Setup* screen appears.

```
┌─────────────────────────┐
│      SYSTEM SETUP       │
│                         │
│ ▶Regeneration           │
│  Security Config        │
│  Communication          │
│  Power Failure          │
│  Pump Configuration     │
│  Display Setup          │
└─────────────────────────┘
```

Figure 4-39: System Setup Screen

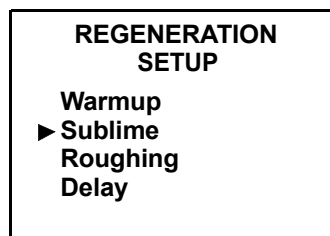3. Choose *Regeneration* and press *Enter*.

The *Regeneration* screen appears.

```
┌─────────────────────────┐
│      REGENERATION       │
│         SETUP           │
│                         │
│  Warmup                 │
│ ▶Sublime                │
│  Roughing               │
│  Delay                  │
│                         │
└─────────────────────────┘
```

Figure 4-40: Regeneration Screen

4. Choose *Sublime* and press *Enter*.

The *Sublime Setup* screen appears.

```
┌─────────────────────────┐
│     SUBLIME SETUP       │
│                         │
│  Temperature (K)  XXX   │
│ ▶Time (min)       YYY   │
│                         │
│                         │
└─────────────────────────┘
```
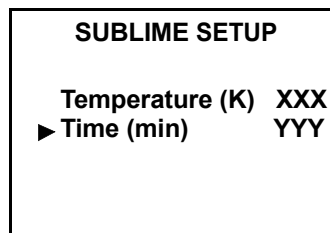
Figure 4-41: Sublime Setup Screen

5. Choose *Time*.

6. Use the arrows on the Remote keypad to set the time (*YYY*) and press *Enter*.

When you start a Time Sublime Regeneration, it sublimes for the time you set.

Start the Timed Sublime Regeneration

To start a Timed Sublime Regeneration:

1. Go to the *On-Board* IS *Cryopump* screen on the Remote keypad.

```
ON-BOARD IS CRYOPUMP

   Monitor
 ►Regeneration
   System Setup
   Control
   Pump Info
```
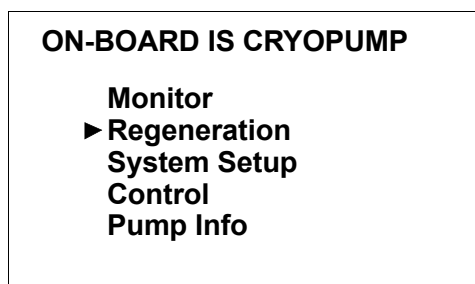
Figure 4-42: Cryopump Main Screen

If the Remote is plugged into the Controller, see Open a Remote Session from the Controller on page 4-5 to get to this screen.

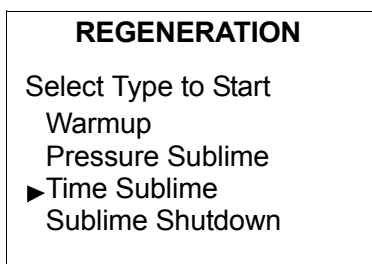2. Choose *Regeneration* and press *Enter*.

The *Regeneration* screen appears.

```
       REGENERATION

Select Type to Start
   Warmup
   Pressure Sublime
 ►Time Sublime
   Sublime Shutdown
```

Figure 4-43: Regeneration Screen

3.   Choose *Time Sublime* and press *Enter*.

The *Start Sublime Regen* screen appears.

```
┌─────────────────────────┐
│ START SUBLIME REGEN     │
│                         │
│     Are you sure?       │
│         No              │
│       ▶ Yes             │
│                         │
│                         │
└─────────────────────────┘
```
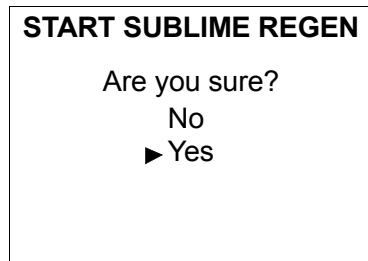
Figure 4-44: Start Sublime Regen Screen

4.   Choose *Yes* and press *Enter*.

The system performs a Timed Sublime Regeneration.

NOTE: *Not all of the frost may sublimate during this time.*

The *Regeneration Status* screen shows when Regeneration is finished.

```
┌─────────────────────────┐
│ REGENERATION STATUS     │
│        IDLE             │
│                         │
│    Sublime Complete     │
│                         │
│ Pump            ON      │
│ Temperature (K)  107    │
│                         │
└─────────────────────────┘
```
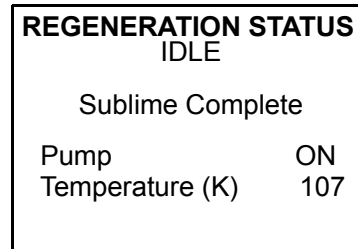
Figure 4-45: Regeneration Status Screen

Perform a Group Full Regeneration

Use a Group Full Regeneration to coordinate rough valve and rough manifold sharing (if applicable) for all cryopumps on the system that regenerate at the same time. The cryopump begins a Warmup With Cooldown or a Pressure Sublime, depending upon the last regeneration it performed.

An On-Board *IS* Cryopump System can have up to five Regeneration Groups or Maps. When the Regeneration starts, the Controller coordinates the rough manifold for each Regeneration Group and rough map. For more information, see Configure Rough Maps on page 3-6 to create rough maps.

NOTE: *If you restart regeneration for any one cryopump while others are in a group regeneration, the restarted pump finishes last.*

To start a Group Full Regeneration:

1.   Plug the Remote into the Controller.

2.   Go to the *On-Board* IS *Controller* screen on the Remote keypad.

```
          ON-BOARD
        IS CONTROLLER

        Monitor
      ▶ Regeneration
        Access Device
        System Setup
        Controller Info
```

Figure 4-46: Controller Main Screen

3.   Choose *Regeneration* and press *Enter*.

The *Regeneration* screen appears.

```
┌─────────────────────────────┐
│       REGENERATION          │
│                             │
│  ► Start                    │
│    Abort                    │
│    Group Regen: OFF         │
│                             │
│                             │
└─────────────────────────────┘
```
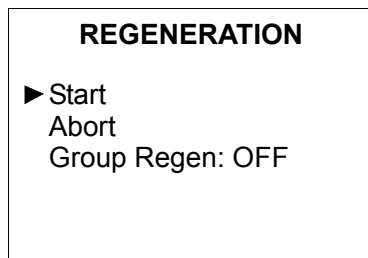
Figure 4-47: Regeneration Screen

4.   Ensure *Group Regen* is *ON*.

5.   Choose *Start* and press *Enter*.

The *Choose Regen Pumps* screen appears.
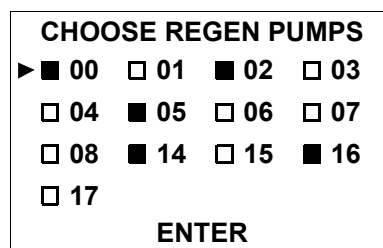
```
┌─────────────────────────────┐
│    CHOOSE REGEN PUMPS       │
│  ►■ 00   □ 01  ■ 02  □ 03   │
│    □ 04  ■ 05  □ 06  □ 07   │
│    □ 08  ■ 14  □ 15  ■ 16   │
│    □ 17                     │
│          ENTER              │
└─────────────────────────────┘
```

Figure 4-48: Choose Regen Pumps Screen

NOTE: *Your pump address may be different from the ones in the previous figure.*

6.   Choose the addresses of the pumps you want to regenerate, use the arrow buttons to choose *Enter* on the screen, and then press *Enter* on the Remote keypad.

The *List to Regen* screen appears. This shows all the cryopump addresses you chose in the previous screen.
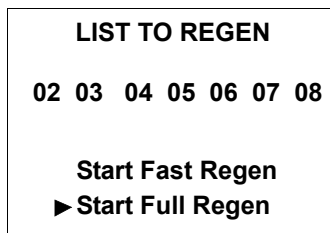
```
┌─────────────────────────────────┐
│                                 │
│        LIST TO REGEN            │
│                                 │
│   02 03  04 05 06 07 08         │
│                                 │
│      Start Fast Regen           │
│    ▶ Start Full Regen           │
│                                 │
└─────────────────────────────────┘
```

Figure 4-49: List to Regen Screen

7.   Choose *Start Full Regen* and press *Enter*.

NOTE: *If you start a Fast Regeneration, the Single Stage Cryopump does not regenerate with the other designated cryopumps. For more information about Fast Regeneration, see the definition in About Regeneration and the On-Board IS Single Stage Cryopump on page 4-8 and the* On-Board *IS* Cryopump Operations Manual.
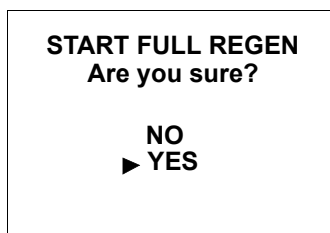
The *Start Full Regen* screen appears.

```
┌─────────────────────────────────┐
│                                 │
│     START FULL REGEN            │
│       Are you sure?             │
│                                 │
│          NO                     │
│        ▶ YES                    │
│                                 │
│                                 │
└─────────────────────────────────┘
```

Figure 4-50: Start Full Regen Screen

8.   Choose *Yes* and press *Enter*.

The *Full Regen Started* screen appears.

```
FULL REGEN RESPONSE
Regeneration Started
```

Figure 4-51: Full Regen Response Screen

Regeneration starts for all designated cryopumps.

Change Regeneration Parameters

Change the parameters for Warmup and Sublime Regeneration to optimize regeneration for your system.

See Regeneration Parameters on page 5-10 for information about parameter options.

See Appendix B: Default Parameters (Values) on page 8-3 for information about default settings.

Change Warmup Regeneration Parameters

You can change these Warmup Regeneration parameters:

- **Extended purge** (time, in minutes): Control the length of time the purge gas flows into the cryopump after it warms up.

- **Cooldown Mode** (on/off): Control the end of Warmup Regeneration by setting it to cooldown or stay warm.

To change the Warmup Regeneration parameters:

1.   Go to the On-Board *IS* Cryopump screen on the Remote keypad.

```
ON-BOARD IS CRYOPUMP

    Monitor
    Regeneration
  ▶ System Setup
    Control
    Pump Info
```
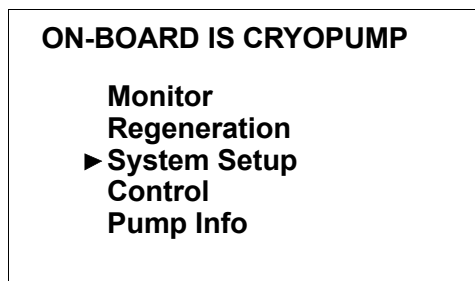
Figure 4-52: Cryopump Main Screen

If the Remote is plugged into the Controller, see Open a Remote Session from the Controller on page 4-5 to get to this screen.

2.   Choose *System Setup* and press *Enter*.
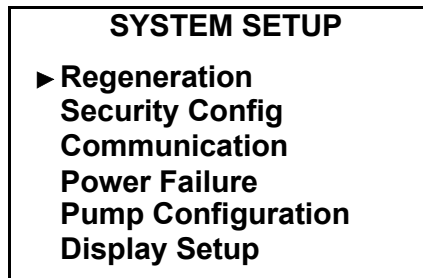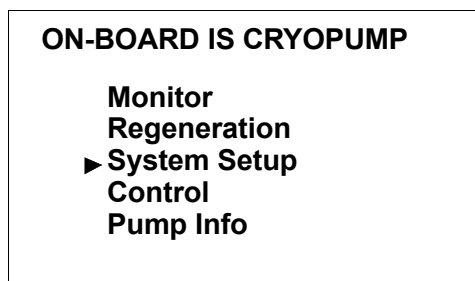
The *System Setup* screen appears.
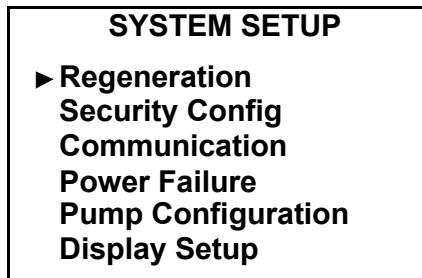
```
┌──────────────────────────────┐
│        SYSTEM SETUP          │
│                              │
│   ► Regeneration            │
│     Security Config          │
│     Communication            │
│     Power Failure            │
│     Pump Configuration       │
│     Display Setup            │
└──────────────────────────────┘
```

Figure 4-53: System Setup Screen

3.   Choose *Regeneration* and press *Enter*.

The *Regeneration* screen appears.

```
┌──────────────────────────────┐
│        REGENERATION          │
│           SETUP              │
│                              │
│   ► Warmup                  │
│     Sublime                  │
│     Roughing                 │
│     Delay                    │
│                              │
└──────────────────────────────┘
```
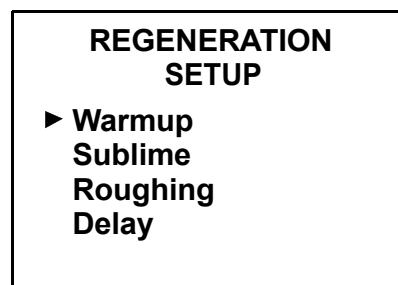
Figure 4-54: Regeneration Screen

4.   Choose *Warmup* and press *Enter*.

The *Warmup Setup* screen appears.

```
┌──────────────────────────────┐
│        WARMUP SETUP          │
│                              │
│   Ext Purge (min)    10      │
│   Cooldown Mode    Off       │
│                              │
│                              │
└──────────────────────────────┘
```
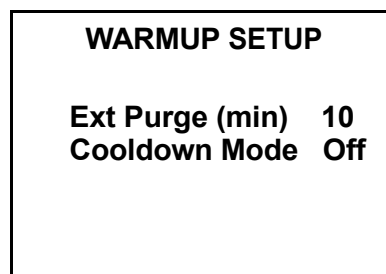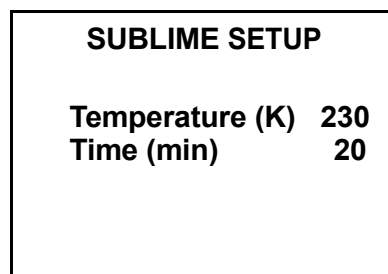
Figure 4-55: Warmup Setup Screen

5. Choose *Ext Purge* or *Cooldown Mode* and press *Enter*.

    The cursor moves to the value (parameter) you want to change, and appears as a blinking line underneath the value.

6. Use the arrow keys on the Remote keypad to change the value, and press *Enter*.

The new parameter is set.

Change Sublime Regeneration Parameters

You can change these Sublime Regeneration parameters:

*   **Temperature** (Kelvin): Control the maximum temperature during a Sublime Regeneration.

*   **Time** (minutes): Control the maximum sublime time during a Time Sublime Regeneration.

To change the Sublime Regeneration parameters:

1. Go to the On-Board *IS* Cryopump screen on the Remote keypad.

```
ON-BOARD IS CRYOPUMP

    Monitor
    Regeneration
  ▶ System Setup
    Control
    Pump Info
```

Figure 4-56: Cryopump Main Screen

If the Remote is plugged into the Controller, see Open a Remote Session from the Controller on page 4-5 to get to this screen.

2.　　　　Choose *System Setup* and press *Enter*.

The *System Setup* screen appears.

```
┌─────────────────────────────┐
│        SYSTEM SETUP         │
│                             │
│   ▶ Regeneration            │
│     Security Config         │
│     Communication           │
│     Power Failure           │
│     Pump Configuration      │
│     Display Setup           │
└─────────────────────────────┘
```

Figure 4-57: System Setup Screen

3.　　　　Choose *Regeneration* and press *Enter*.

The *Regeneration* screen appears.

```
┌─────────────────────────────┐
│        REGENERATION         │
│           SETUP             │
│                             │
│     Warmup                  │
│   ▶ Sublime                 │
│     Roughing                │
│     Delay                   │
└─────────────────────────────┘
```
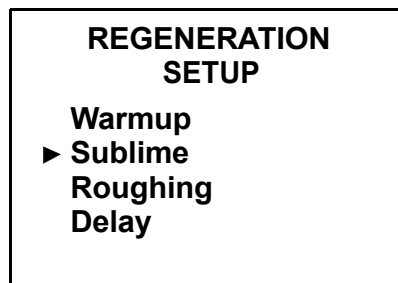
Figure 4-58: Regeneration Screen

4.　　　　Choose *Sublime* and press *Enter*.

The *Sublime Setup* screen appears.

```
┌─────────────────────────────┐
│       SUBLIME SETUP         │
│                             │
│                             │
│   Temperature (K)   230     │
│   Time (min)         20     │
│                             │
│                             │
└─────────────────────────────┘
```

Figure 4-59: Sublime Setup Screen

5.   Choose *Temperature* or *Time* and press *Enter*.

       The cursor moves to the value (parameter) you want to change, and appears as
       a blinking line underneath the value.

6.   Use the arrow keys on the Remote keypad to change the value, and press *Enter*.

7.   Turn on Rough Coordination. See Configure Rough Maps on page 3-6.

The new parameter is set.

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5 About Single Stage Cryopump Remote Screens

Overview

This chapter shows all the Remote screens you can see through the Single Stage Cryopump or the Controller, using the On-Board *IS* Remote keypad (the Remote).

Chapter Contents

About Local Cryopump Remote Screens

Local Remote screens are specific to one cryopump, as opposed to using system Remote screens for mutltiple system components.

You can access local Remote screens when you plug the Remote keypad into the Controller (see Open a Remote Session from the Controller on page 4-5), or an individual Single Stage Cryopump.

See the following sections for descriptions of all Single Stage Cryopump local Remote screens.

About the Cryopump Main Screen and Functions

The following figure shows the cryopump main screen (home screen) after you plug the Remote directly into an On-Board *IS* Single Stage Cryopump.

```
ON-BOARD IS CRYOPUMP

  ▶ Monitor
    Regeneration
    System Setup
    Control
    Pump Info
```
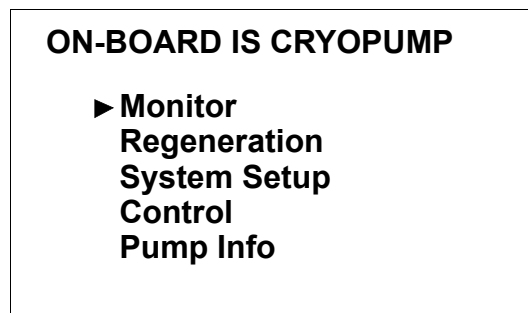
Figure 5-1: Cryopump Main Screen

Each function on the main screen leads to other screens, from which you can see the status and re-configure cryopump processes. These are the basic purposes of each cryopump function:

Monitor

Use the Monitor function to view the cryopump data and configurations status of the Single Stage Cryopump. Refer to the Monitor Screens on page 5-4 within this section for more information.

Regeneration

Use the Regeneration function to establish regeneration cycle information. Refer to Regeneration Screens on page 5-7 within this section for more information.

System Setup

Use the System Setup function to change and display the configuration of the cryopump. Refer to System Setup Screens on page 5-9 within this section for more information.

Control

Use the Control function to see the settings for the cryopump, valves, and temperature. You can also clear an HFI trip and initiate a Startup or Shutdown. Refer to Control Screens on page 5-15 within this section for more information.

Pump Info

Use the Pump Info function to see the serial number, address and other information about the cryopump. Refer to Cryopump Information Screen on page 5-18 within this section for more information.

Monitor Screens

To view activity for this cryopump, choose any *Monitor* screen item.
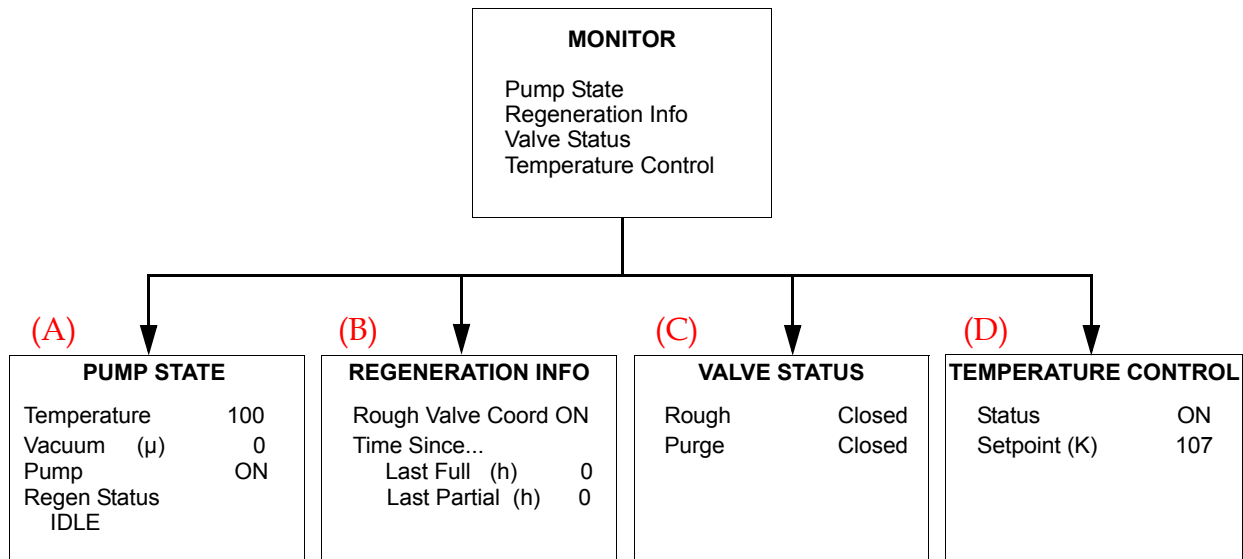
Figure 5-2: Cryopump Monitor Screens

NOTE: *You cannot change any settings when you view Monitor screens. They show the current status of the cryopump.*

The following table briefly describes each part of the Monitor screens, including parameters set by the cryopump (system) or parameters set by you (user). The letter preceding the screen name corresponds to the letter above each screen in Figure 5-2.

Table 5-1: Monitor Definitions, by Screen

Screen Name	Screen Component	Set by System or Set by User	Parameter and (Explanation)
(A) Pump State	Temperature (in Kelvin, K)	System	*OPN* (temperature sensor is open) 5K to 350K, actual temperature range *SHO* (temperature sensor is shorted)
	Vacuum (pressure in microns, µ)	System	0µ to 999µ (N/A if system does not have a TC gauge.)
	Pump	System	*On* (motor is running and pump is operating) Off
	Regen Status	System	*Warmup in progress, Sublime in progress, Shutdown in progress, Idle* (See About Regeneration and the On-Board IS Single Stage Cryopump on page 4-8.)
(B) Regeneration Info	Rough Valve Coord	System	*On, Off*
	Time Since Last Full (in hours, h)	System	*[XXX]* (Time since last Warmup, Pressure Sublime, or Sublime Shutdown.)
	Time Since Last Partial (in hours, h)	System	*[XXX]* (Time since last Time Sublime, Warmup, Pressure Sublime, or Sublime Shutdown.)
(C) Valve Status	Rough	System	Open, Closed, N/A
	Purge	System	Open, Closed, N/A

Table 5-1: Monitor Definitions, by Screen

Screen Name	Screen Component	Set by System or Set by User	Parameter and (Explanation)
(D) Temperature Control	Status	System	On, Off
	Setpoint	System	(Uses setpoint during Temperature Control. See Valve Control and Temperature Control Screens on page 5-17.)

Regeneration Screens

To view and set the Regeneration activities (functions) for this cryopump, use the *Regeneration* screens.

NOTE: *The screen is password protected if the security is set. See Security Parameters on page 5-11 to set a password.*

If Regeneration is **idle**, then this screen appears:
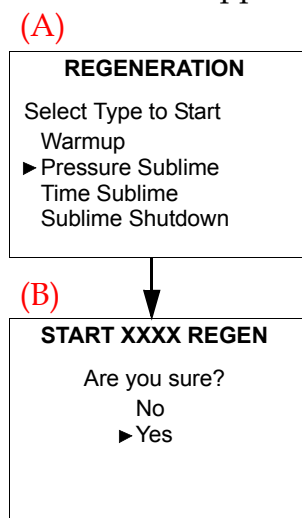
If Regeneration is **running**, then this screen appears:

(A)

REGENERATION

Select Type to Start
  Warmup
▶ Pressure Sublime
  Time Sublime
  Sublime Shutdown

No   Yes

(B)

START XXXX REGEN

Are you sure?
No
▶ Yes

(C)

REGENERATION STATUS
XXXX in Progress

XXXX
  Regen messages here
  Regen messages here

▶ Abort

Abort

(D)

ABORT REGENERATION

Are you sure?
No
▶ Yes

No

Yes

ABORT REGENERATION

Regeneration Has Aborted
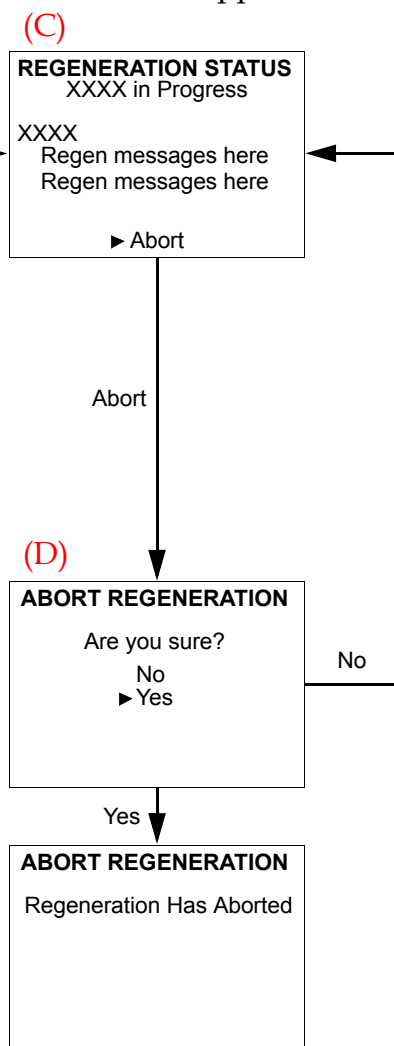
Figure 5-3: Regeneration Screens

The following table briefly describes each part of the Regeneration screens, including the action that occurs after you choose an item on the screen. The letter preceding the screen name in the table corresponds to the letter above each screen in Figure 5-3.

Table 5-2: Regeneration Definitions, by Screen

Screen Name	Screen Component Choice	Action and (Explanation)
(A) Regeneration	Warmup	A Warmup Regeneration is ready to start. (See About Regeneration and the On-Board IS Single Stage Cryopump on page 4-8 and Change Warmup Regeneration Parameters on page 4-31).
	Pressure Sublime	A Pressure Sublime is ready to start. (See About Regeneration and the On-Board IS Single Stage Cryopump on page 4-8 and Regeneration Parameters on page 5-10).
	Time Sublime	A Time Sublime is ready to start. (See About Regeneration and the On-Board IS Single Stage Cryopump on page 4-8 and Regeneration Parameters on page 5-10).
	Sublime Shutdown	A Sublime Shutdown is ready to start. (See About Regeneration and the On-Board IS Single Stage Cryopump on page 4-8 and Regeneration Parameters on page 5-10.)
(B) Start XXXX Regen	Yes	Starts the Regeneration you chose.
	No	Returns to (A) Regeneration screen.
(C) Regeneration Status	XXXX in Progress	Continues the Regeneration you chose.
	Abort	Gives you the option of stopping the Regeneration.
(D) Abort Regeneration	Yes	Stops the Regeneration.
	No	Does not stop the Regeneration.

System Setup Screens

Through the System Setup, you can manage regeneration, security, communication rates, power failure, and Remote display.
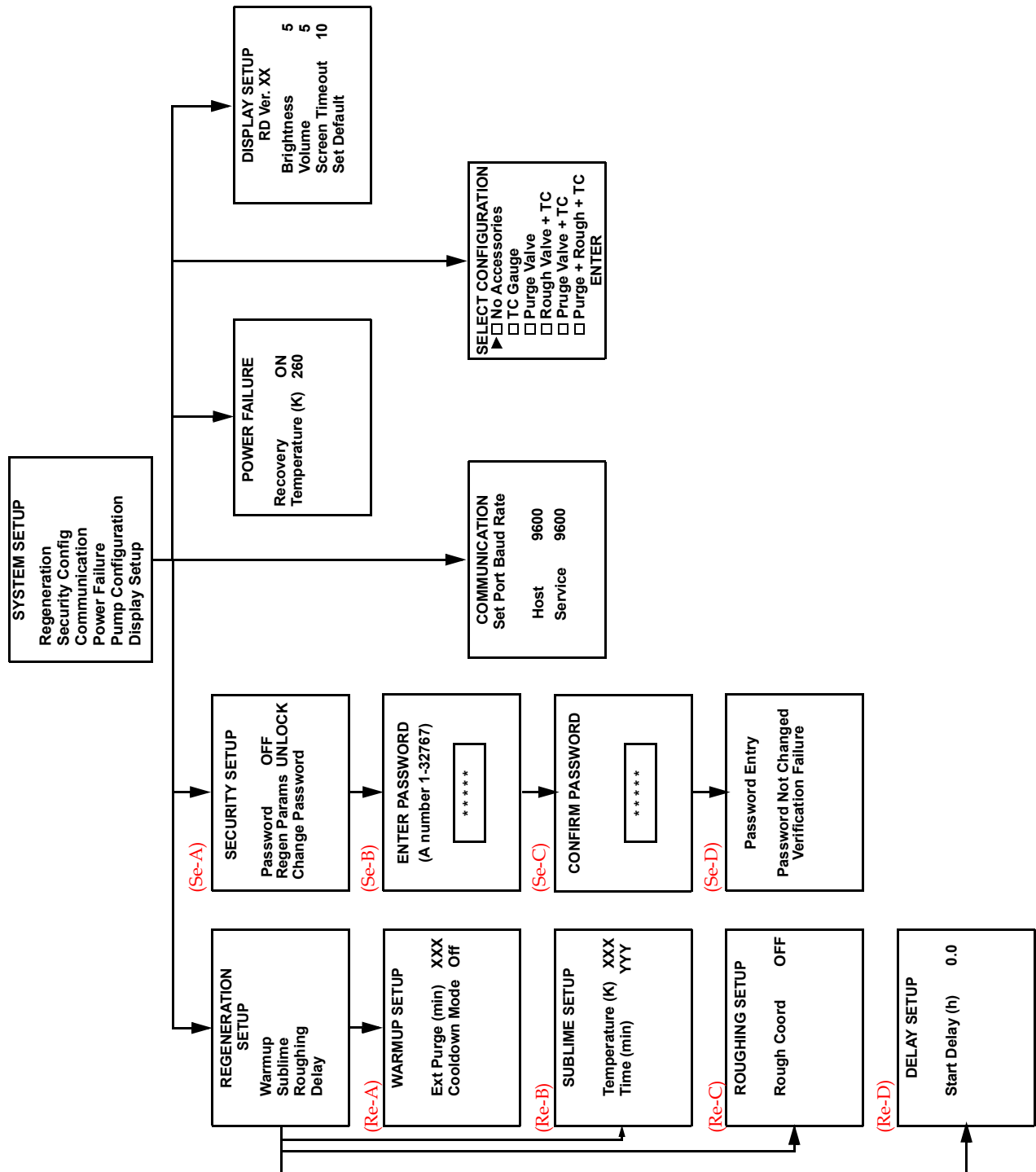
Figure 5-4: Cryopump System Setup Function Screens

The following sections briefly describe each part of the System Setup screens, including the action that occurs after you choose an item on the screen or parameters, if applicable.

Regeneration Parameters

On the Regeneration Setup screen, each function you choose brings you to a different screen.

The following table briefly describes each of the Regeneration Setup screens, including the action that occurs after you choose an item on the screen or parameters. The letter preceding the screen name in the table corresponds to the letter above each screen in Figure 5-4 on page 5-9.

Table 5-3: System Setup: Regeneration Setup Definitions, by Screen

Screen Name	Screen Component Choice	Set by System or Set by User	*Parameter*, Action, and (Explanation)
(Re-A) Warmup Setup	Ext Purge (in minutes, min)	User	*0 to 999 minutes* Set the extended purge time.
	Cooldown Mode	User	*On*: cools down to a setpoint. *Off*: maintains Warmup setpoint. (See Appendix B: Default Parameters (Values) on page 8-3)
(Re-B) Sublime Setup	Temperature (in Kelvin, K)	User	*110 to 250K* Setpoint for all sublime regenerations.
	Time (in minutes, min)	User	*0 to 600 minutes* Setpoint for Time Sublime.
(Re-C) Roughing Setup	Rough Coord	User	*On*: Rough coordination is on. *Off*: Rough coordination is off.
(Re-D) Delay Setup	Start Delay (in hours, h)	User	*0 to 99.9 hours* Set a time delay before Regeneration starts.

Security Parameters

The following table briefly describes the Security Setup screen, including the action that occurs after you choose an item on the screen or parameters. The letter preceding the screen name in the table corresponds to the letter above each screen in Figure 5-4 on page 5-9.

Table 5-4: System Setup: Security Setup Definitions, by Screen

Screen Name	Screen Component Choice	Set by System or Set by User	*Parameter*, Action, and (Explanation)
(Se-A) Security Setup	Password	User	*On:* All screens except *Monitor* and *Pump Info* require a password. *Off*: No password is required to view any screens.
	Regen Params (Regeneration Parameters)	User	*Lock*: *Regeneration* screens **are** password protected. *Unlock*: *Regeneration* screens **are not** password protected.
	Change Password	N/A	Opens the *Enter Password* screen so that you can change the password.
(Se-B) Enter Password	_ _ _ _ _	User	*1 to 32767* (Arrow keys on the Remote keypad change the password numbers.)
(Se-C) Confirm Password	_ _ _ _ _	User	*1 to 32767, same as you chose in the* Enter Password *screen.* (Arrow keys on the Remote keypad change the password numbers.)
(Se-D) Password Entry	N/A	System	(Press *Back* to return to the *Enter Password* screen.)

Communication Parameters for the RS-232 Ports

The following table briefly describes the Communication Setup screens, including the action that occurs after you choose an item on the screen or parameters. See Figure 5-4 on page 5-9 for the actual Communication Setup screen.

Table 5-5: System Setup: Communication Setup Definitions, by Screen

Screen Component Choice	Set by System or Set by User	*Parameter*, Action, and (Explanation)
Host	User	*2400* *9600* *19200* *38400* Sets the baud rate for the host port.
Service	User	*2400* *9600* *19200* *38400* Sets the baud rate for the service port.

Power Failure Recovery Parameters

The following table briefly describes the Power Failure screen (see Figure 5-4 on page 5-9), including the action that occurs after you choose an item on the screen or parameters.

Table 5-6: System Setup: Power Failure Definitions, by Screen

Screen Component Choice	Set by System or Set by User	*Parameter* and Action
Recovery	User	*On:* A regeneration may start after the power is restored, depending on the cryopump status. *Off*: The cryopump performs no action after a power failure. *Cool*: The cryopump starts cooling if it is below the power failure setpoint.

Table 5-6: System Setup: Power Failure Definitions, by Screen

Screen Component Choice	Set by System or Set by User	*Parameter* and Action
Temperature (in Kelvin, K)	User	*110 to 260K* After a power failure, the cryopump uses this setpoint to evaluate its status, and determine which action to perform.

Configuration of Cryopump Hardware

The following table briefly describes the Select Configuration screen (see Figure 5-4 on page 5-9), including the action that occurs after you choose an item on the screen or parameters.

See Configure Accessories for the Cryopump on page 2-9 to set the appropriate accessory configuration.

Table 5-7: System Setup: Configuration Definitions, by Screen

Screen Component Choice	Set by System or Set by User	*Parameter*, Action, and (Explanation)
No Accessories	User	(Choose if the cryopump has no hardware associated with it.)
TC Gauge	User	(Choose if the cryopump has a TC gauge only.)
Purge Valve	User	(Choose if the cryopump has a purge valve only.)
Rough Valve + TC	User	(Choose if the cryopump has a rough valve and a TC gauge.)
Purge Valve + TC	User	(Choose if the cryopump has a purge valve and a TC gauge.)
Purge + Rough + TC	User	(Choose if the cryopump has a purge valve, a rough valve, and a TC gauge.)
Enter	N/A	Sets the hardware you chose.

Remote Parameters, Including the Display

The following table briefly describes the Display Setup screen (see Figure 5-4 on page 5-9), including the action that occurs after you choose an item on the screen or parameters.

Table 5-8: System Setup: Display Setup Definitions, by Screen

Screen Component Choice	Set by System or Set by User	*Parameter* and Action
Brightness	User	*0 to 15:* The Remote display window increases (to 0) or decreases in brightness (to 15).
Volume	User	*0 to 16*: The volume of the confirmation beep increases (to 16) or decreases (to 0, silence).
Screen Timeout	User	*0 to 60 minutes*: The time of keypad inactivity until the screen saver mode starts.
Set Default	User	Resets cryopump parameters back to the default settings.

Control Screens
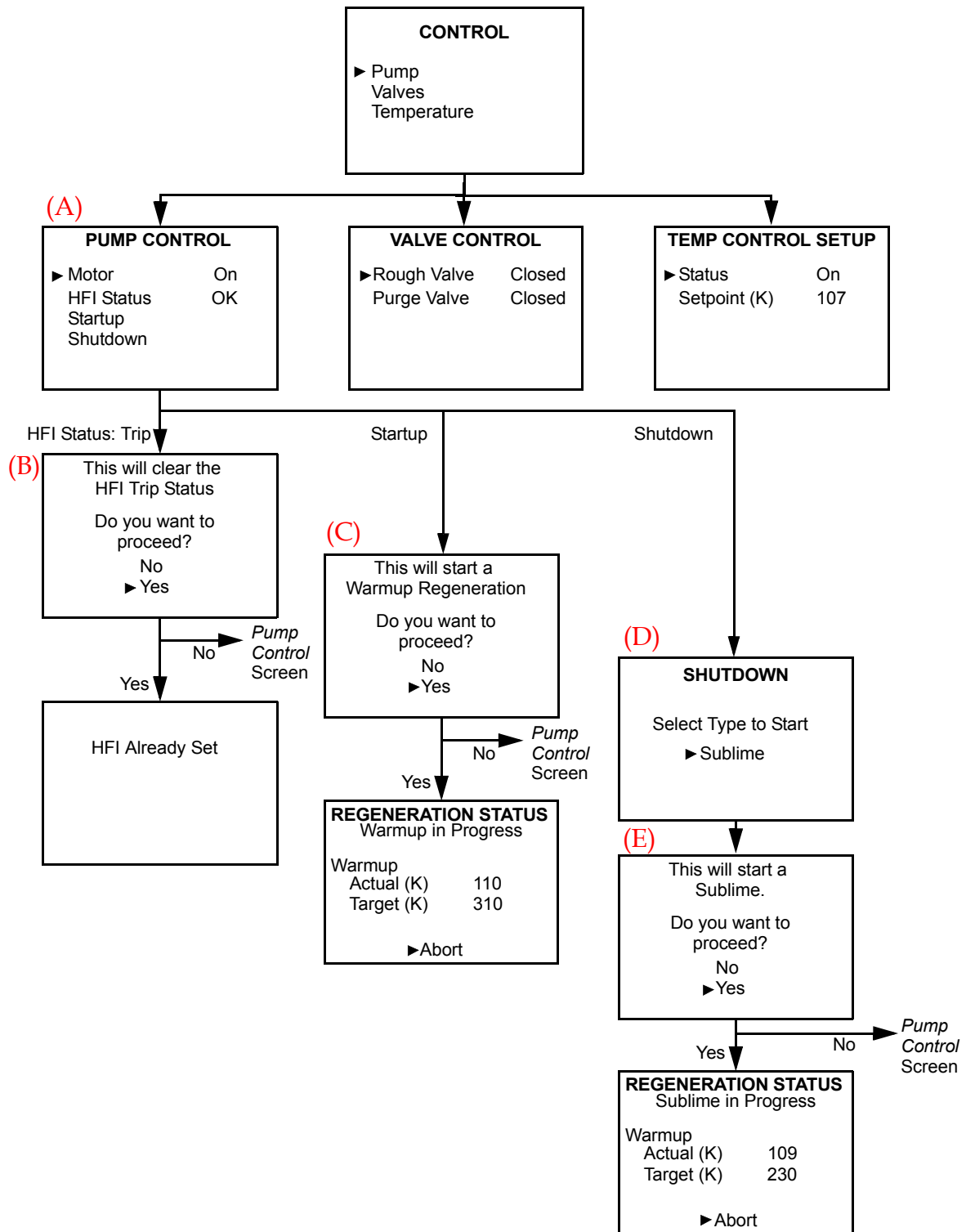
Figure 5-5: Cryopump Control Function Screens

Pump Control Screens

The following table briefly describes each of the Pump Control screens, including the action that occurs after you choose an item on the screen or parameters. The letter preceding the screen name in the table corresponds to the letter above each screen in .

Table 5-9: Control: Pump Control Definitions, by Screen

Screen Name	Screen Component Choice	Set by System or Set by User	*Parameter*, Action, and (Explanation)
(A) Pump Control	Motor	System	*On*: Cryopump motor is on and cooling. *Off*: Cryopump motor is off, and the cryopump is warm or warming. *Idle:* Cryopump motor is idling and cryopump is cool.
	HFI Status	User	*OK*: Opens a screen to notify you that the HFI is already set. (Circuit is complete and does not need to be reset.) *Trip*: Opens the *Clear HFI Trip Status* screen. (Circuit must be cleared.)
	Startup	N/A	Opens the *Start a Warmup Regeneration* screen.
	Shutdown	N/A	Opens the *Shutdown* screen.
(B) Clear HFI Trip Status	No	N/A	Opens the *Pump Control* screen.
	Yes	N/A	Resets HFI status to Ok.
(C) Start a Warmup Regeneration	No	N/A	Opens the *Pump Control* screen.
	Yes	N/A	Starts a Warmup Regeneration and uses the Cooldown Mode. Opens the *Regeneration Status* screen.
(D) Shutdown	Sublime	N/A	Opens the *Start a Sublime* screen.

Table 5-9: Control: Pump Control Definitions, by Screen

Screen Name	Screen Component Choice	Set by System or Set by User	*Parameter*, Action, and (Explanation)
(E) Start a Sublime Regeneration	No	N/A	Opens the *Pump Control* screen.
	Yes	N/A	Starts a Sublime Shutdown Regeneration. Opens the *Regeneration Status* screen.

Valve Control and Temperature Control Screens

The following table briefly describes the Valve Control screen and the Temperature control screen (see Figure 5-5), including the action that occurs after you choose an item on the screen or parameters.

Table 5-10: Control: Valve and Temperature Control Definitions, by Screen

Screen Name	Screen Component Choice	Set by System or Set by User	*Parameter* and Action
Valve Control	Rough	User	*Open*: Rough valve is open. *Closed*: Rough valve is closed. *N/A*: There is no rough valve on the cryopump.
	Purge	User	*Open*: Purge valve is open. *Closed*: Purge valve is closed. *N/A*: There is no purge valve on the cryopump.
Temperature Control	Status	User	*On*: Temperature control is on. System maintains temperature at control setpoint. *Off*: Temperature control is off.
	Setpoint	User	*0 to 320 K* Default = 107K Sets the temperature to which the cryopump cools.

Cryopump Information Screen

```
┌─────────────────────────────┐
│         PUMP INFO           │
│                             │
│   S/N          XXXXXX       │
│   Address          01       │
│   Oper. Time      999       │
│   Soft. Rev    SFxx.xx      │
│                             │
└─────────────────────────────┘
```

Figure 5-6: Cryopump Information Screen

The following table briefly describes the Pump Info screen.

Table 5-11: Pump Info Definitions, by Screen

Screen Component Choice	Set by System or Set by User	*Parameter* and Explanation
S/N (Serial Number)	System	The serial number of the cryopump.
Address	System	The network address of the cryopump.
Oper. Time (Operating Time)	System	The total time (in hours) the cryopump motor has been on.
Soft. Rev (Software Revision)	System	The current version number of the software for the cryopump.

6 About Controller Remote Screens

Overview

This chapter shows all the Remote screens you can see through the On-Board IS Controller (Controller), using the On-Board *IS* Remote keypad (the Remote).

Chapter Contents

About Cryopump System (Controller) Screens

You can use the On-Board *IS* Remote keypad to control the cryopump and other system components individually through the component itself, or system-wide through the On-Board *IS* Controller (Controller).

Plug the Remote keypad into the Controller for the system. See the *On-Board* IS *Remote Quick Installation Guide* for rack and pump mount Controller details.

For more information about how to use the Remote, see Using the On-Board IS Remote Keypad on page 4-2.

You can also access local cryopump screens through the Controller (see Open a Remote Session from the Controller on page 4-5). For more information about these screens, see About Local Cryopump Remote Screens on page 5-2.

This chapter also shows the Controller screens that are applicable to the Single Stage Cryopump in these sections:

- Monitor Screens on page 6-5

- Regeneration Screens on page 6-7

- Access Device Screens on page 6-9

- System Setup Screens on page 6-11

About the Main Controller Screen and Functions

After you plug the Remote into the Controller, the *On-Board* IS *Controller* Screen appears:

```
     ON-BOARD
     IS CONTROLLER

     Monitor
     Regeneration
     Access Device
     System Setup
     Controller Info
```

Figure 6-1: On-Board IS *Controller Screen*

Monitor

Use this menu item to access the *Monitor Network* screen, through which you can:

• View the network status; cryopump temperatures and compressor pressures

• View the network addresses of system components (network devices)

• View the regeneration rough pump and power fail coordination options

• View the cryopumps on each helium map

Regeneration

Use this menu item to access the *Regeneration* screen, through which you can:

• Start and control Group Full Regeneration

• Configure the Group Full Regeneration map

Access Device

Use this menu item to access the *Choose Device* screen, through which you can:

• Check the status of compressors and cryopumps

• Open a Remote Session with individual cryopumps; see Open a Remote Session from the Controller on page 4-5.

System Setup

Use this menu item to access the *System Setup* screen, through which you can:

- Set the regeneration rough pump coordination and power fail coordination
- Set the cryopumps and compressors on each helium map
- Set or change a password for the Remote
- Set the Controller communication values

Controller Info

Use this menu item to access the *Controller Info* screen, through which you can view the serial number and software revision number.

Monitor Screens

To view network activity for the system, choose any *Monitor* screen item.

```
                        ┌─────────────────────────┐
                        │  MONITOR NETWORK        │
                        │                         │
                        │  Network Status         │
                        │  Show Devices           │
                        │  Show Regen Setup       │
                        │  Helium                 │
                        └─────────────────────────┘
```

(A) NETWORK STATUS

Pumps
Compressors

(B) NETWORK DEVICES

Pumps   7
Compressors   2

(C) REGENERATION

Coordination
   Full   On
   Pwr Fail   On

Rough Map   1

(D) HELIUM MANAGEMENT

Show Helium Maps

PUMP TEMP ID T1/T2 (K)

01 35/12   02 120/108
03 150/84   04 50/37
05 43/40   06 123/175
07 99/8

NETWORK PUMPS

00   01   02   03   04
05   06   07   14   15
16   17

Rough Map 1

00   01   02   03   04
14   17

Next Map

Helium Map 1

00   02   04   05   14
15   16   20   22

Next Map

IS COMPRESSORS
(SupplyP/DeltaP)

20 15/30

NETWORK COMPRESSORS

20   21   22

Figure 6-2: Controller Monitor Network Screens

NOTE: *You cannot change any settings when you view Monitor screens. They show the current status of the cryopump.*

The following table briefly describes each part of the Monitor screens, including parameters automatically set by the system or parameters set by you (user). The letter preceding the screen name corresponds to the letter above each screen in Figure 6-2.

Table 6-1: Monitor Definitions, by Screen

Screen Name	Screen Component	Set by System or User	Parameter and (Explanation)
(A) Network Status	Pump Temp ID T1/T2 (K)	System	Cryopump address Stage 1 temperature / Stage 2 temperature
	IS Compressors (SupplyP/DeltaP)	System	Compressor address Helium supply pressure / Difference in pressure
(B) Network Devices	Network Pumps	System	Crypump addresses.
	Network Compressors	System	Compressor addresses.
(C) Regeneration	Coordination: Full	System	On, Off (Full Group Roughing capabilities are on or off.)
	Coordination: Pwr Fail	System	On, Off (Power Fail recovery capabilities are on or off.)
	Rough Map	System	1, 2, 3, 4, 5 (Choose the Rough Map number to see which cryopumps belong to a specific rough map.)
Rough Map 1	N/A	System	Cryopump addresses for cryopumps assigned to this rough map.
(D) Helium Management	Status	System	On, Off
	Setpoint	System	110K to 250K (Current temperature of cryopump.)

Regeneration Screens

To configure and control Group Full Regeneration, use the *Regeneration* screens.

NOTE: *Single Stage Cryopumps are not capable of performing a Fast Regeneration. See* *About Regeneration and the On-Board IS Single Stage Cryopump on page 4-8*.
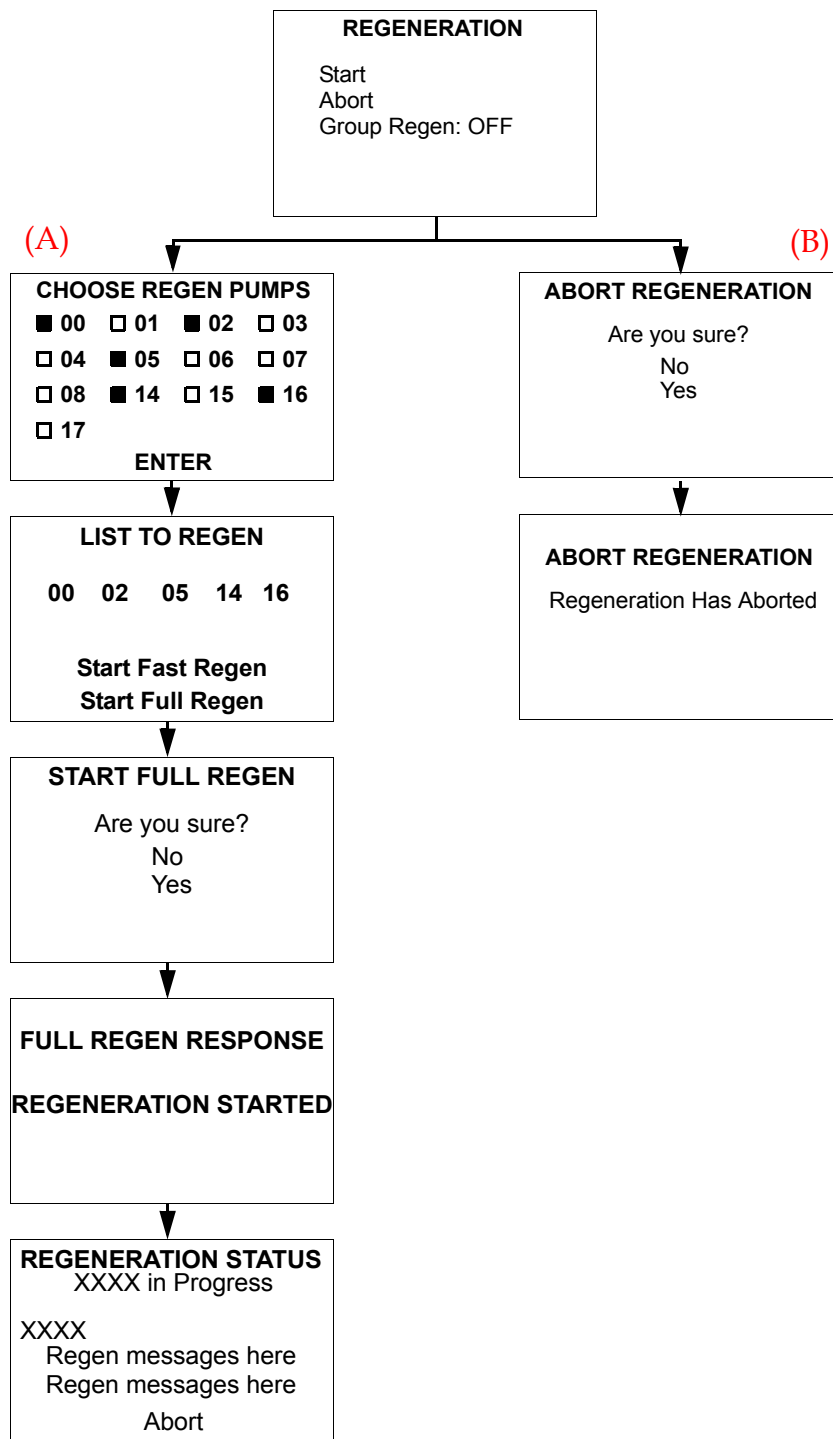
Figure 6-3: Controller Regeneration Screens

The following table briefly describes each part of the Regeneration screens, including the action that occurs after you choose an item on the screen. The letter preceding the screen name in the table corresponds to the letter above each screen in Figure 6-3. For more information, see About Regeneration and the On-Board IS Single Stage Cryopump on page 4-8, and especially the definitions of Group Full Regeneration and Group Fast Regeneration.

Table 6-2: Regeneration Definitions, by Screen

Screen Name	Screen Component Choice	*Parameter*, Action, and (Explanation)
Regeneration	Start	Opens the next screen in the sequence to start a regeneration.
	Abort	Opens the next screen in the sequence to stop a regeneration.
	Group Regen	*On, Off* (Group Regeneration capabilities are on or off.)
(A) Choose Regen Pumps	(Cryopump Addresses)	Choose the cryopumps, by address, that you want included in a Group Full Regeneration.
List to Regen	Start Fast Regen	N/A (A Single Stage Cryopump cannot perform a Fast Regen, and is excluded if you choose it.)
	Start Full Regen	All cryopumps you choose start a Group Full Regeneration.
Start Full Regen	Yes	Starts the Regeneration.
	No	Does not start the Regeneration.
Regeneration Status	N/A	Updates the state of regeneration, based on the regeneration type.
(B) Abort Regeneration	Yes	Stops the Regeneration.
	No	Does not stop the Regeneration.
Abort Regeneration	N/A	Regeneration stops.

Access Device Screens

To view complete information about individual system components, or open a Remote session, use the *Access Device* screens.

```
┌─────────────────────────┐
│     CHOOSE DEVICE       │
│                         │
│  ► Pumps          12    │
│    Compressors     3    │
│                         │
└─────────────────────────┘
```

(A)

```
┌─────────────────────────┐
│     NETWORK PUMPS       │
│                         │
│  00  01  03  04  05     │
│  06  07  08  14  15     │
│  16  17                 │
│                         │
└─────────────────────────┘
```

(Press Enter on Keypad,
Remote Session Opens)

(From Main Cryopump Screen,
Press Back Arrow on Keypad)

```
┌─────────────────────────┐
│   CLOSE REMOTE SESSION  │
│                         │
│      Are you sure?      │
│         No              │
│         Yes             │
│                         │
└─────────────────────────┘
```

```
┌─────────────────────────┐
│                         │
│     Remote Session      │
│     With Pump XX        │
│   Has Been Terminated   │
│                         │
└─────────────────────────┘
```

(B)

```
┌───────────────────────────┐
│   NETWORK COMPRESSORS     │
│                           │
│     20    21    22        │
│                           │
└───────────────────────────┘
```

```
┌───────────────────────────┐
│      Compressor 20        │
│  Supply (psig)      400   │
│  Return (psig)      200   │
│  Delta (psig)       200   │
│  Water In (F)        82   │
│  Water Out (F)      102   │
│  Operating (h)      123   │
└───────────────────────────┘
```

Figure 6-4: Controller Choose Device (Access Device) Screens

The following table briefly describes each part of the Access Device screens, including the action that occurs after you choose an item on the screen. The letter preceding the screen name in the table corresponds to the letter above each screen in Figure 6-4.

Table 6-3: Access Device Definitions, by Screen

Screen Name	Screen Component Choice	Action and Explanation
Choose Device	Pumps	Shows total number of cryopumps connected to the Controller. Choose *Pumps* to see a list of cryopump addresses.
	Compressors	Shows total number of compressors connected to the Controller. Choose *Compressors* to see a list of compressor addresses.
(A) Network Pumps	(Cryopump Addresses)	Choose a cryopump, by address, for which you want to open a remote session.
(Remote Session Opens)	(Main screen for component)	See About the Cryopump Main Screen and Functions on page 5-2.
Close Remote Session	Yes	Remote session closes, and confirmation screen appears.
	No	Remote session continues, main screen for component appears.
(B) Network Compressors	(Compressor Addresses)	Choose a compressor, by address, for which you want to see the current statistics.
Compressor XX	N/A	Shows the statistics for a compressor

System Setup Screens

Through the System Setup, you can manage regeneration maps, security, communication with the RS-232 port, helium maps, and the keypad display options.
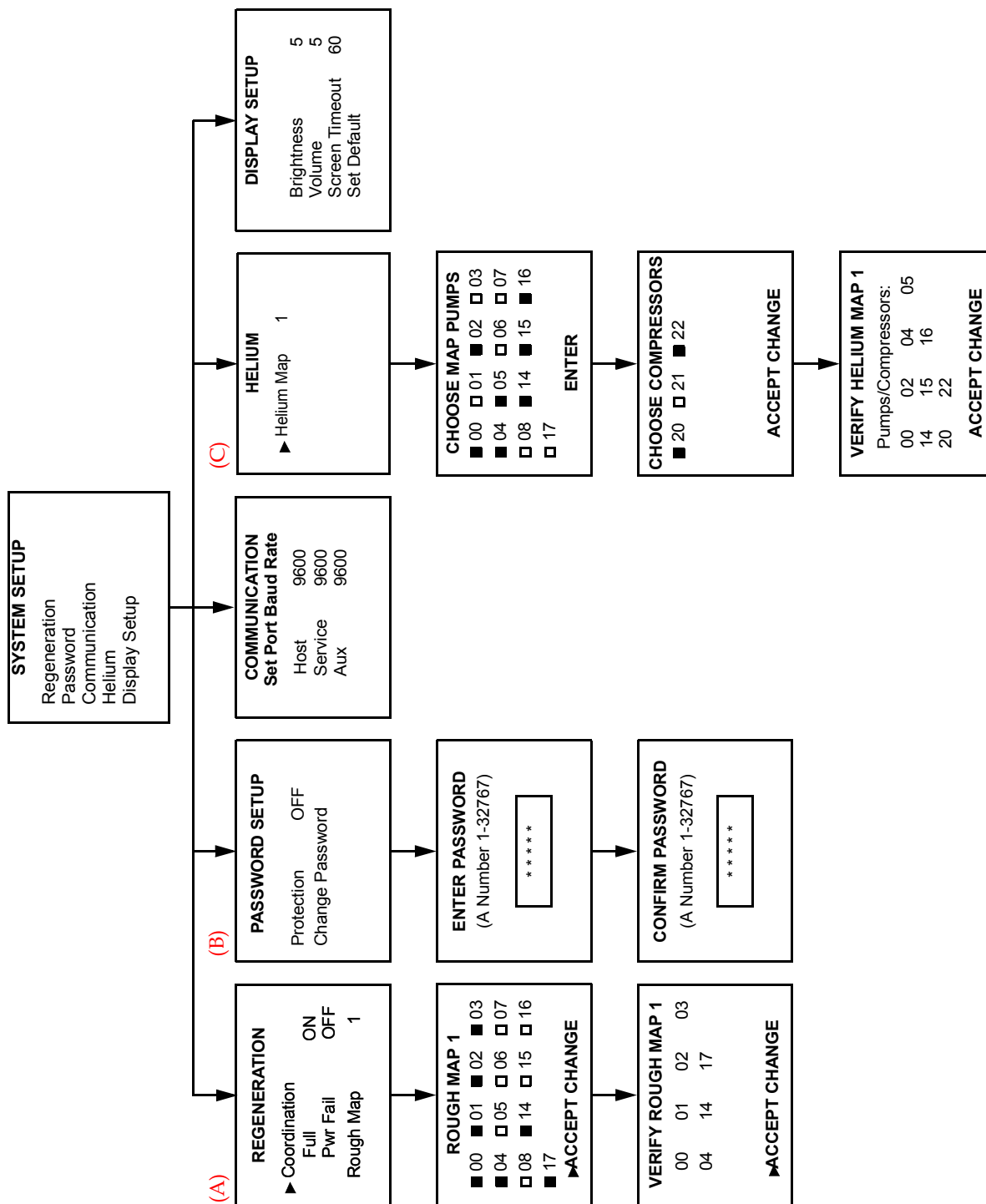
Figure 6-5: Controller System Setup Screens

The following sections briefly describe each part of the System Setup screens, including the action that occurs after you choose an item on the screen or parameters, if applicable.

System Setup, Regeneration

On the Regeneration Setup screen, each function you choose brings you to a different screen.

The following table briefly describes each of the Regeneration Setup screens, including the action that occurs after you choose an item on the screen or parameters. The letter preceding the screen name in the table corresponds to the letter above each screen in .

Table 6-4: System Setup: Regeneration Setup Definitions, by Screen

Screen Name	Screen Component Choice	Set by System or User	*Parameter*, Action, and (Explanation)
(A) Regeneration Setup	Coordination: Full	User	*On, Off* (Group roughing capabilities are on or off.)
	Coordination: Pwr Fail	User	*On, Off* (Power Fail recovery capabilities are on or off.)
	Rough Map 1	User	1, 2, 3, 4, 5 Choose the Rough Map number to assign the cryopumps to a specific rough map.
Rough Map 1	(Cryopump Addresses)	User	Cryopumps that you want to include in a Rough Map.
Verify Rough Map 1	(Cryopump Addresses)	System (information from previous screen)	Choose *Accept Change* or press the *Back* button.

System Setup, Password

The following table briefly describes the Security Setup screen, including the action that occurs after you choose an item on the screen or parameters. The letter preceding the screen name in the table corresponds to the letter above each screen in .

Table 6-5: System Setup: Password Definitions, by Screen

Screen Name	Screen Component Choice	Set by System or User	*Parameter*, Action, and (Explanation)
(B) Security Setup	Password	User	*On:* All screens except *Monitor* and *Pump Info* require a password. *Off*: No password is required to view any screens.
	Change Password	N/A	Opens the *Enter Password* screen so that you can change the password.
Enter Password	_ _ _ _ _	User	*1 to 32767* (Arrow keys on the Remote keypad change the password numbers.)
Confirm Password	_ _ _ _ _	User	*1 to 3277, same as you chose in the* Enter Password *screen.* (Arrow keys on the Remote keypad change the password numbers.)

System Setup, Communication for the RS-232 Ports

The following table briefly describes the Communication Setup screens, including the action that occurs after you choose an item on the screen or parameters. See for the actual Communication Setup screen.

Table 6-6: System Setup: Communication Definitions, by Screen

Screen Component Choice	Set by System or User	*Parameter*, Action, and (Explanation)
Host	User	*2400* *9600* *19200* *38400* Sets the baud rate for the host port.
Service	User	*2400* *9600* *19200* *38400* Sets the baud rate for the service port.
Aux	User	*2400* *9600* *19200* *38400* Sets the baud rate for the auxiliary port.

System Setup, Helium Maps

The following table briefly describes the Helium screens, including the action that occurs after you choose an item on the screen or parameters. See Figure 6-5 on page 6-11 for the actual Helium screen.

Table 6-7: System Setup: Helium Definitions, by Screen

Screen Name	Screen Component Choice	Set by System or User	*Parameter*, Action, and (Explanation)
(C) Helium	Helium Map 1	User	*1, 2, 3, 4, 5* Choose the Helium Map number to assign the cryopumps and compressors to a specific helium map.
Choose Map Pumps	(Cryopump Addresses)	User	Cryopumps that you want to include in a helium map
Choose Compressors	(Compressor Addresses)	User	Compressors that you want to include in a helium map
Verify Helium Map 1	(Cryopump and Compressor Addresses)	System (information from previous two screens)	Choose *Accept Change* or press the *Back* button.

System Setup, Remote Display

The following table briefly describes the Display Setup screen (see Figure 6-5 on page 6-11), including the action that occurs after you choose an item on the screen or parameters.

Table 6-8: System Setup: Display Setup Definitions, by Screen

Screen Component Choice	Set by System or User	*Parameter* and Action
Brightness	User	*0 to 15:* The Remote display window increases (to 0) or decreases in brightness (to 15).
Volume	User	*0 to 16*: The volume of the confirmation beep increases (to 16) or decreases (to 0, silence).
Screen Timeout	User	*0 to 60 minutes*: The time of keypad inactivity until the screen saver mode starts.
Set Default	User	Resets cryopump parameters back to the default settings.

Controller Info Screen

On the Controller Info screen, you can view the serial number and software revision number of the Controller.

```
CONTROLLER INFO

S/N          XXXXXX
Soft. Rev    VAxx.xx
```

Figure 6-6: Controller Info Screen

The following table briefly describes each part of the Controller Info screen.

Table 6-9: Controller Info Definitions, by Screen

Screen Component Choice	Set by System or User	*Parameter* and Explanation
S/N (Serial Number)	System	The serial number of the Controller.
Soft. Rev (Software Revision)	System	The current version number of the software for the Controller.

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7 Troubleshooting

Overview

This chapter provides information about troubleshooting the Single Stage Cryopump.

NOTE: *See Appendix A: Customer Brooks Automation Technical Support Information on page 8-2 for customer support and contact information if necessary.*

Chapter Contents

Intercomponent Network Potential Problems

Refer to the following table if you are experiencing Intercomponent Network communication problems.

Table 7-1: Intercomponent Network Potential Problems

Problem	Possible Cause	Corrective Action
1. Cryopumps are not visible on Controller screens.	1a. A network terminator is not installed in the last cryopump on channel A or B.	1a. Refer to the *On-Board IS Cryopump Quick Installation Guide* and install a network terminator in the last cryopump on channels A or B.
	1b. The cryopump is connected to channel C.	1b. Disconnect the cryopump from channel C and connect it to channels A or B.
	1c. Defective network cable.	1c. Replace network cable.
	1d. Remote keypad cable is not connected.	1d. Plug in Remote keypad cable.
2. Compressors are not visible on Controller screens.	2a. A network terminator is not installed in the last compressor on channel C.	2a. Refer to the *On-Board IS 1000 Compressor Quick Installation Guide* and install a network terminator in the last compressor on channel C.
	2b. The compressor is connected to channels A or B.	2b. Disconnect the compressor from channels A or B and connect it to channel C.
	2c. Defective network cable.	2c. Replace network cable.
	2d. Remote keypad cable is not connected.	2d. Plug in Remote keypad cable.

Table 7-1: Intercomponent Network Potential Problems

Problem	Possible Cause	Corrective Action
3. Status LED III on the Controller is *not* blinking.	3a. Channel A, B or C network cable is disconnected from controller.	3a. Connect the network cable(s) to the controller.
	3b. Defective network cable.	3b. Replace network cable.

Cryopump Operation Potential Problems

Refer to the following table if you are experiencing problems operating the cryopump.

Table 7-2: Cryopump Operation Potential Problems

Problem	Possible Cause	Corrective Action
Received this message on the Remote: **FAST REGEN RESPONSE** **Regen Did Not Start Reason:** **Problem Pump List**	Tried to start a Fast Regeneration with a Single Stage Cryopump in a Group.	Remove the Single Stage Cryopump from the Regeneration Map. See Perform a Group Full Regeneration on page 4-27.
Cryopumps do not warm to target regeneration temperature due to heaters not starting.	The HFI is tripped.	See Pump Control Screens on page 5-16 to clear the HFI trip status.

8 Appendices

Overview

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

Contents

Appendix A: Customer Brooks Automation Technical Support Information

When contacting Brooks Automation for Technical Support, please have the following information available.

1. Record the part number and serial number from the equipment.

2. Provide the installed location of the equipment.

3. Provide name, e-mail address, and telephone number of the person to contact.

4. List any error codes received during the failure.

5. Prepare a detailed description of the events relating to the error.

    •   Time that the equipment has been in operation

    •   Work that was done on the equipment prior to the error

    •   Functions that the equipment was performing when the error occurred

    •   Actions taken after the error and the results of those actions

    •   Other information that may assist the Specialist

6. Contact Brooks Automation Technical Support at these numbers:

Brooks Location	GUTS® Contact Number
North America	1-800-FOR-GUTS (1-800-367-4887) US/Canada +1-978-262-2900
Europe	+49 1804 CALL GUTS (+49 1804 2255 4887)
Japan	+81-45-477-5980
China	+86-21-5131-7066
Taiwan	+886-3-552-5225
Korea	+82-31-288-2500
Singapore	+65-6464-1481

For additional contact information, please go to the Brooks Automation web site at www.brooks.com or send an E-mail to techsupport@brooks.com.

Appendix B: Default Parameters (Values)

The following table shows the default values for regeneration and purges. To change applicable values, see Change Regeneration Parameters on page 4-31 or Regeneration Parameters on page 5-10.

Table 8-1: Default Process Values and Parameters

Part of Process	Default Value	Parameter
Extended Warmup purge time	10 minute	0 - 999 minutes
Power fail recovery	OFF	ON/OFF/*COOL
Power fail recovery temperature	260K	110 - 260K
Rough coordination	OFF	ON/OFF
Start delay time	0	0 - 99.9 hours
Sublime maximum temperature	230K	110 - 250K
Timed Sublime maximum rough time	30 minutes	0 - 600 minutes
*Not a parameter set by a user.		

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