



**M Y N A H<sup>SM</sup>**

**Krohne Driver for DeltaV  
Programmable Serial Interface Card  
Series 2**

**USER MANUAL**

**Rev. P1.20**

**April 28, 2006**

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# 1 INTRODUCTION

## 1.1 Scope

This document is the User Manual for the Krohne serial communication driver firmware for the Emerson DeltaV Control System; it provides information required to install, configure, and maintain the driver firmware on the DeltaV Series 2 Programmable Serial Interface Card (PSIC). The reader should be familiar with Emerson's DeltaV controller system and the Krohne Equipment. This driver supports the BM 100 devices only.

The section *Document Format* briefly describes the contents of each section of this manual. *System Specifications* outlines hardware and software requirements for the Krohne Driver (P1.20) firmware. *Related Documents* lists other documents used to prepare this manual.

## 1.2 Document Format

This document is organized as follows:

<b>Introduction</b>	Describes the scope and purpose of this document.
<b>Theory of Operation</b>	Provides a general functional overview of the Krohne Driver.
<b>Downloading Firmware</b>	Describes downloading procedures for the Krohne firmware on to the DeltaV PSIC.
<b>PSIC Configuration</b>	Describes procedures and guidelines for configuring the DeltaV PSIC.
<b>Driver Communications</b>	Describes Krohne commands used and DeltaV Registers containing Krohne data.
<b>Operational Check</b>	Provides tips and assistance to ensure PSIC is properly setup and configured.
<b>DeltaV – Krohne Electrical Interface</b>	Describes the electrical interface between DeltaV and the Krohne devices. Also describes the pin assignments for RS-485 communications.
<b>Technical Support</b>	Describes who to call if you need assistance.



**1.3 System Specifications**

The following table lists the minimum hardware requirements for the Krohne Driver:

**Table 1: System Specifications**

<b>Firmware</b>	Krohne Driver Firmware (P1.20)
<b>Protocol Compatibility</b>	Krohne Communication Protocol (Reflex Radar BM 100 with RS485 Busprotocol), Revision 1.09, dated January 24, 1997.
<b>Software Requirements</b>	DeltaV System Software (Release 4.2 or later) installed on a hardware-appropriate Windows NT workstation configured as a ProPlus for DeltaV Serial Interface Port License (VE4102)
<b>Minimum Hardware Requirements</b>	FRSI DeltaV PSIC Hardware PN: 12P2506X022 FRSI DeltaV M3, M5, MD or Series 2 MD Controller, Power Supply and 2 wide controller carrier FRSI 8 wide I/O card carrier Krohne BM 100 devices



## **2 THEORY OF OPERATION**

As part of the serial interface port license, a standard Modbus protocol is installed on the DeltaV PSIC prior to customization. The PSIC needs to be flash upgraded from the Modbus protocol to the Krohne protocol before operation.

The RS-485 communication settings must be configured properly to ensure accurate communication between the PSIC and BM 100 devices. Typically, the BM 100 devices communicate at 9600 baud, 8-bits, even parity, and 2 stop bits.

This driver functions as a master only. In this mode, the PSIC continuously sends data read commands to the connected devices. The received responses are reported to DeltaV via dataset registers.

A fixed architecture will be used to configure the PSIC. Specifically, 4 BM 100 devices will be configured for each dataset, with 12 floating point registers per device. This will allow communications with a maximum of 64 BM 100 devices, multi-dropped under a single PSIC port. The PSIC will only read the following information from each device:

1. Level;
2. Interface Level;
3. Volume;
4. Interface Volume;
5. Ullage Volume; and
6. Status.

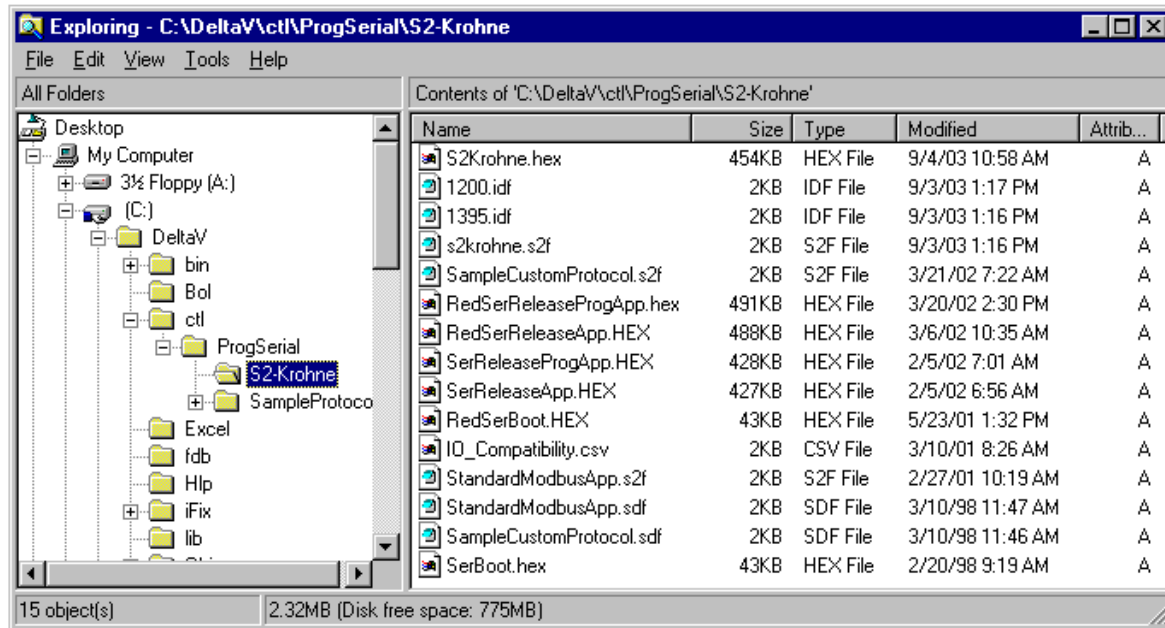


### 3 Downloading the firmware

The driver software is distributed on a CD. These files must be copied to the DeltaV directory (you must create the directory first) on your ProPlus Workstation. The path is:

**\\DeltaV\ctl\ProgSerial\S2-KROHNE**

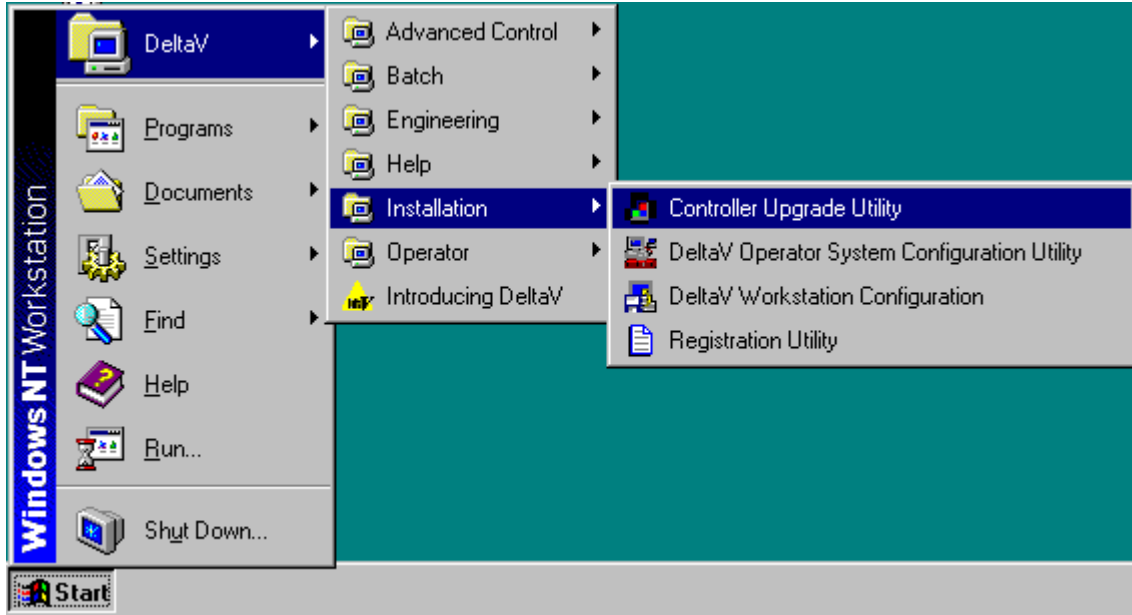
The following shows a completed copy operation:



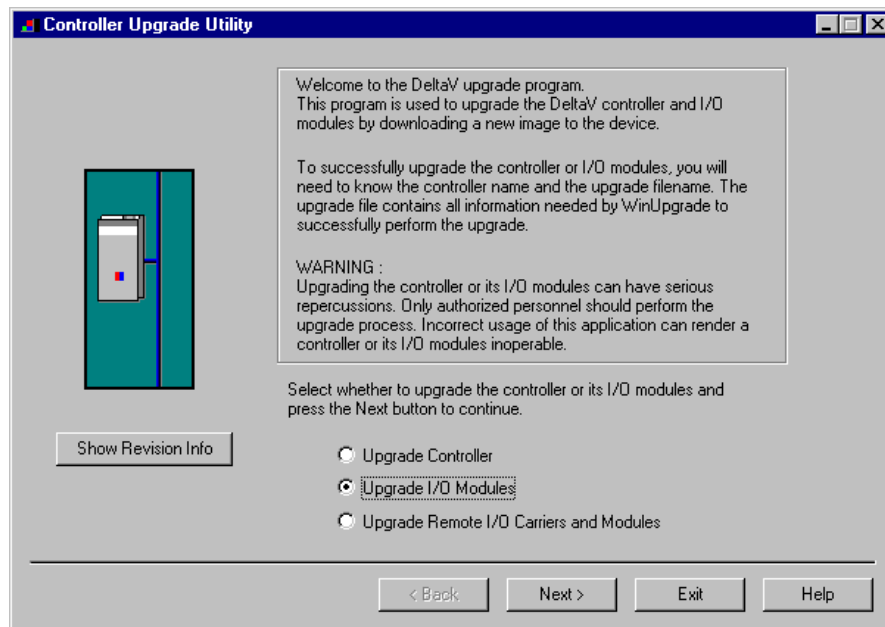
After copy completion, you are ready to program (or upgrade) the Programmable Serial Card with the supplied custom driver software. The steps are as follows:



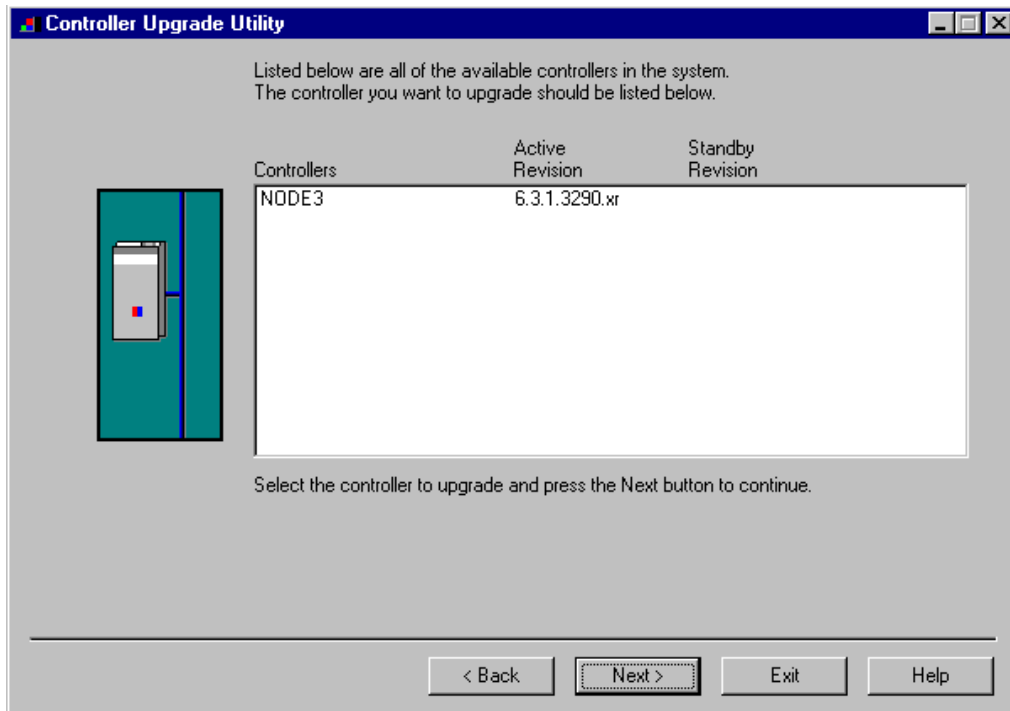
1. Click on the Start button and select DeltaV, Installation, Controller Upgrade Utility as shown below.



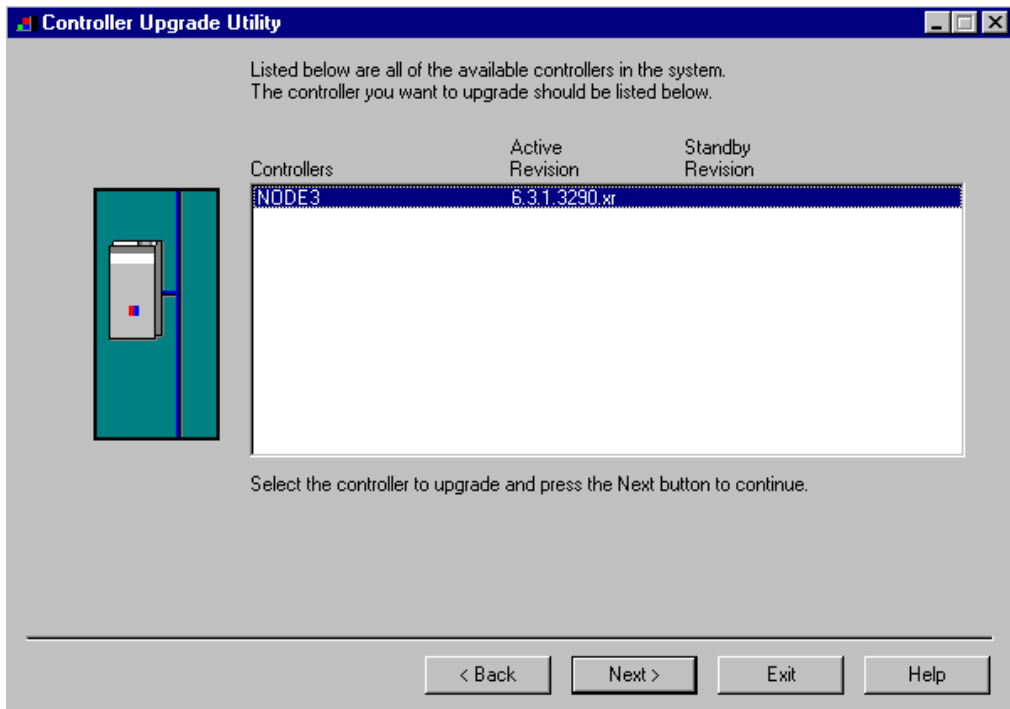
The following dialog will appear:



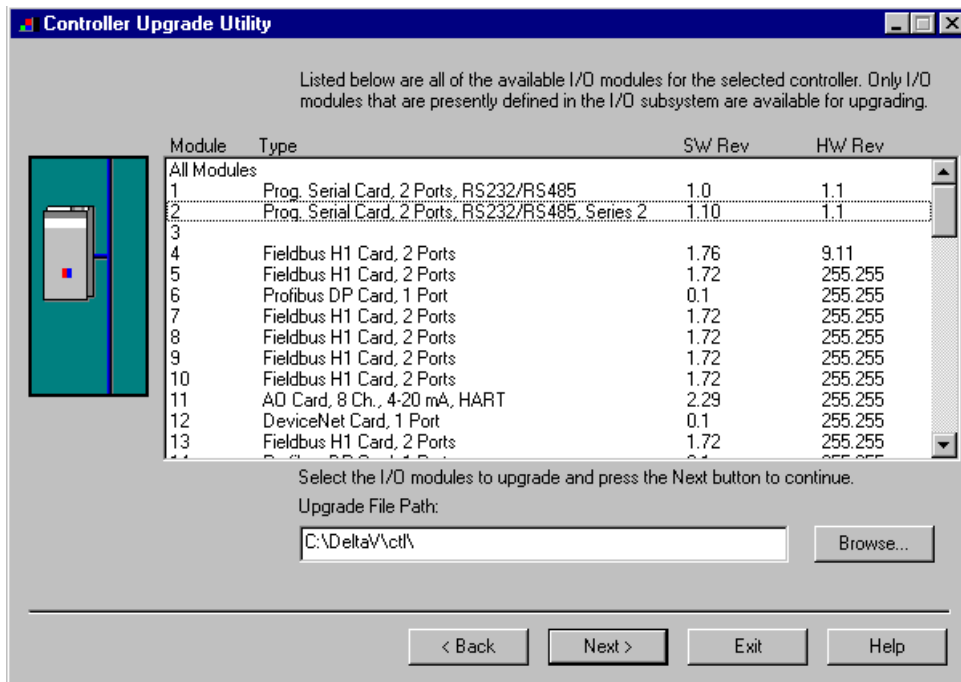
Click on the Upgrade I/O Modules radio button as shown, and then click Next.



The above dialog will appear, listing all the available Controllers in your network. From this dialog, select the appropriate Controller and then Click Next as shown below.



After you Click Next, the following dialog will appear, listing all the I/O modules in your selected Controller. The shown list of I/O modules is an example only. Your list will be different.



From this dialog, select the Programmable Serial Card I/O Module in the list. For example, we will select I/O Module 2. This will give you the following dialog, from which you will select the file path to where the driver software is located. This will be:

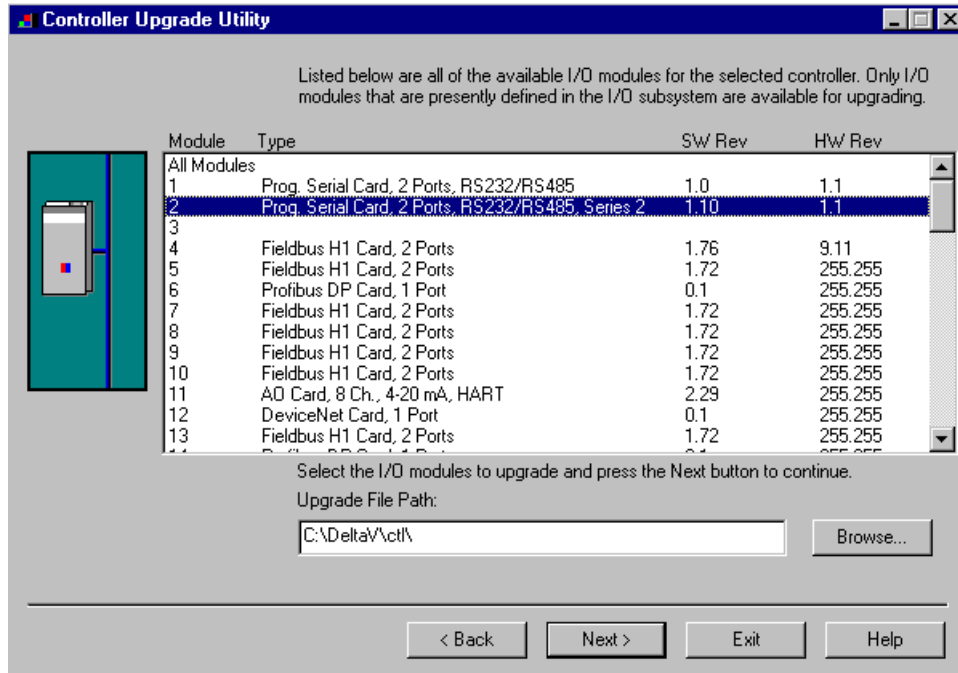
**\\DeltaV\ct\ProgSerial\S2-KROHNE**

Once you are in the specified directory, you will need to select the following file:

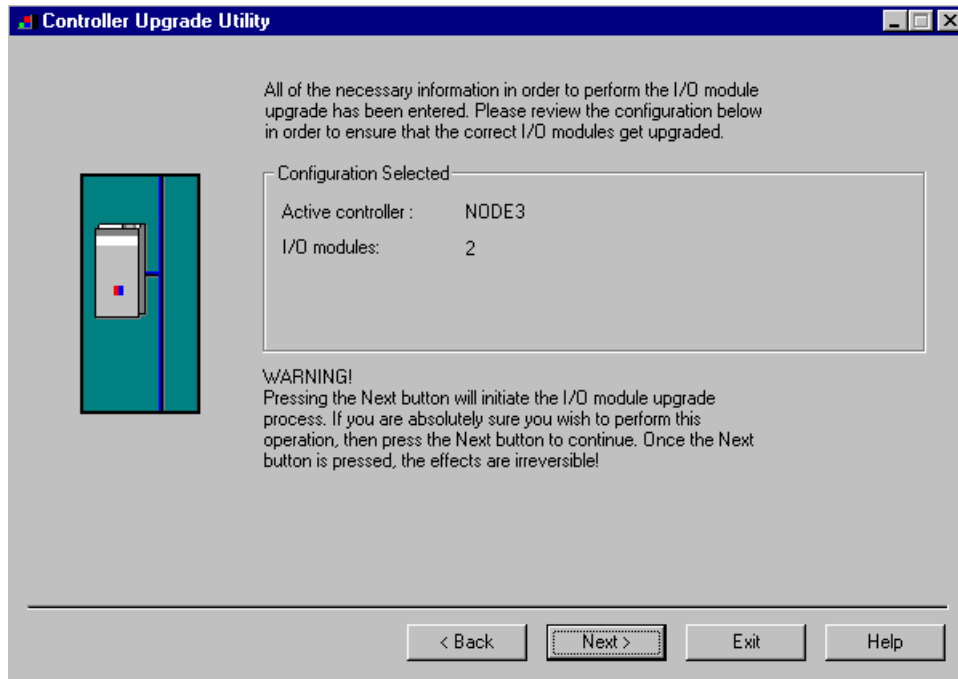
**S2KROHNE.S2F**

Click on Open after selecting the .S2F file. This dialog will close and you will be back to the following:

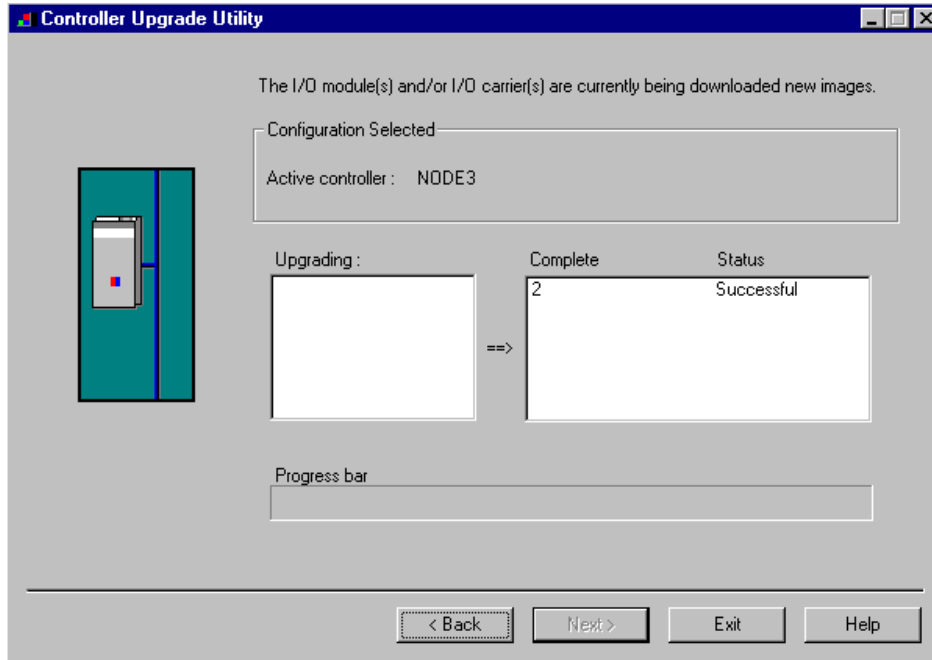




In this dialog, Click Next again. You will get the following dialog, confirming the Controller and I/O Module to program.



Click Next and the I/O Module upgrade process will begin. After completion, you will receive the following dialog, indicating success.



This completes the I/O Module upgrade process.



## **4 CONFIGURATION INFORMATION**

This section describes the steps necessary to configure the DeltaV PSIC and the Krohne device to obtain proper communication.

### **4.1 Device And Dataset Configuration**

The following paragraphs discuss some attributes in the device and dataset configuration:

#### **4.1.1 Device Address:**

Only one device is configured under each port. The driver does not use the Device Address. Consequently it may be left at its default value of 1.

#### **4.1.2 Output Mode:**

All datasets will be of type Input.

#### **4.1.3 DeltaV Data Type:**

The Data Type for each dataset will be Floating point with status.

#### **4.1.4 DeviceDataType**

Configure this value as 1. A value of 1 tells the driver that this dataset has configured BM 100 devices that are to be read. A value of 0 can be configured to bypass the configured devices.

#### **4.1.5 Data Start Address and Number of Values**

Configure all datasets with Starting Address as 0, and Number of values as 48. Table 2 described which dataset register is assigned to which device. If a device is not configured, the corresponding group of registers remains unused.

**Table 2: Device Assignment**

<b>BM 100 Device</b>	<b>Registers Assigned</b>
Device 1	R1-R12
Device 2	R13-R24
Device 3	R25-R36
Device 4	R37-R48



The assigned registers for each device will always have the following values:

**Table 3: Value Assignment**

<b>Dataset Register Number</b>	<b>Value Assigned</b>
R1, R13, R25, R37	Level
R2, R14, R26, R38	Interface Level
R3, R15, R27, R39	Volume
R4, R16, R28, R40	Interface Volume
R5, R17, R29, R41	Ullage Volume
R6, R18, R30, R42	Status – Hardware Errors
R7, R19, R31, R43	Status – Signal Errors
R8, R20, R32, R44	Status – Markers (Warnings)
R9, R21, R33, R45	BM 100 Status

All other registers are reserved and presently unused.

#### **4.1.6 Special Data 1-5**

Configure Special Data 1-4 with addresses of 4 BM 100 devices. Valid addresses are 1-255. To stop communications with one of the 4 devices, change the address to 0. Note that the driver does not support a valid BM 100 address of 0. Special Data 5 should be configured with its default value of 0.



## **5 Operational Check**

### **5.1 Scope**

The following sections provide some assistance to ensure the interface is working properly.

### **5.2 Verify Hardware and Software Version Number**

The user can verify that the Krohne driver has been installed using the DeltaV Diagnostics tool. The Diagnostics tool will show the Hardware Revision No. (HwRev) and the Software Revision No. (SwRev).

To begin the DeltaV Diagnostic tool select Start-> DeltaV-> Operator-> Diagnostics. In the Diagnostics tool expand the Controller, I/O and then double click on the Programmable Serial Interface Card that has the Krohne driver installed.

The following information will be displayed:

:	:	:
HwRev	Hardware Revision	1.1 (or later)
SwRev	Software Revision	P1.0 (or later)

### **5.3 Verify Configuration**

- Verify port configuration: The serial port must be enabled. User needs to make sure communication settings such as baud rate, parity, and number of data bits match the Krohne device settings.
- Verify dataset configuration: The datasets configured must be as shown above.

### **5.4 Verify I/O Communication With Control Studio**

User can create I/O modules in the control studio to verify correct values are read from the Krohne and the PSIC. For input data, the values should be changed in the Krohne and verified that the new data are correctly reported.

### **5.5 Using Diagnostics**

- Verify PSIC communication: Select the PSIC on Diagnostics and press the right mouse button. Select Display Real -Time Statistics from the drop down menu. If the Programmable Serial Interface Card is functioning then the user will see the Valid Responses counter and the Async and/or Sync Transactions counters incrementing. There will not be any error counting up.



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- Verify port statistics: Select the Port on the Programmable Serial Interface Card and press the right mouse button. Then select Display Port Statistics from the drop down menu. Verify that the port communications statistics are being displayed properly and are counting as expected for the Krohne protocol's functionality.
- Verify dataset values: Select a dataset and press the right mouse button. Select View Dataset Registers from the Drop down window. Verify that the dataset values are displayed as expected.

## **5.6 LED Indication**

The Yellow LED for the port should be on solid when all communications on that port are valid. The Yellow LED should be blinking if there is some valid communications and some communications with errors on that port. The Yellow LED should be OFF if there are no valid communications on that port.





## 6 DeltaV - Krohne Electrical Interface

The electrical interface between DeltaV and the Krohne BM 100 devices conforms to the RS-485 half duplex protocol (2-wire). Section 6.1 shows the pin assignments for the PSIC serial terminal block for RS-485 protocol. Connect PSIC Data+ to BM 100 Data+, and PSIC Data- to BM 100 Data-.

### 6.1 RS-485 Pin Assignments for DeltaV PSIC

Terminal Number	Signal Description
1	Port 1 - Isolated Ground (GND)
2	Port 1 – Data +
3	Unused
4	Port 1 – Data –
5	Unused
6	Unused
7	Unused
8	Unused
9	Port 2 - Isolated Ground (GND)
10	Port 2 – Data +
11	Unused
12	Port 2 – Data –
13	Unused
14	Unused
15	Unused
16	Unused



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## **7 Technical Support**

For technical support or to report a defect, please give MYNAH Technologies a call at (636) 681-1555. If a defect is discovered, please document it in as much detail as possible and then fax your report to us at (636) 681-1660.

You can also send us your questions via e-mail. Our address is:

[support@mynah.com](mailto:support@mynah.com)

Thank you for using DeltaV.