HYDROBLAST™

Application Software User Manual

98637000 REV-Rel

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FOREWORD

Note: This Manual, P/N 98637000, is to be used by qualified and trained personnel, knowledgeable of NFPA standards and any other applicable standards in effect.

This Manual is intended to provide guidance to qualified technical professionals for the configuration, operation and maintenance of the HydroBlast™ Intelligent Mining washdown monitor (cannon) system.

Only qualified persons experienced and trained in the installation of this type of equipment should install and configure the HydroBlast. They must be familiar and experienced with the wiring diagrams and components,electrical installation, and familiar not only with NEC, relevant NFPA and local codes but also trained and qualified by Elkhart Brass Manufacturing Company, Inc (a Safe Fleet Company). Elkhart Brass Manufacturing Company, Inc. is a manufacturer of the components that make up the HydroBlast washdown system, and may not have the opportunity to visit the sites where the product is installed or intended to be installed. It is the responsibility of the professional installer (described above) to properly install and configure the systems. Under no circumstances will Elkhart Brass Manufacturing Company, Inc. be liable for improper installation or configuration of the systems.

The technical data contained herein is provided for informational purposes only, and should not be used as a substitute for professional judgment. Although, Elkhart Brass Manufacturing Company, Inc. believes this information to be true and correct, it is published and presented without any guarantee or warranty whatsoever. Elkhart Brass Manufacturing Company, Inc. disclaims any liability for any use of the data other than as set out in this manual, foreword included.

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TERMS AND ABBREVIATIONS

°C	°Celsius
°F	°Fahrenheit
CAN	Controller Area Network
cm	Centimeters
DC	Direct Current
ft	Feet
HMI	Human Machine Interface
m	Meters
mm	Millimeters
N	Newtons
LED	Light Emitting Diode
NEC	National Electric Code
NEMA	Nation Electrical Manufacturers Association
NFPA	National Fire Protection Association

PRODUCT SAFETY INFORMATION

- All personnel who may be expected to use this equipment must be thoroughly trained in its safe and proper use.
- Before issuing commands from control unit to flowing water from the monitor, check that all personnel are out of the stream path. Also, check to make sure stream direction will not cause avoidable property damage.
- Become thoroughly familiar with the hydraulic characteristics of this equipment, and the pumping system used to supply it. To produce effective streams, operating personnel must be properly trained.
- Whenever possible, this equipment should be operated from a remote location. Do not needlessly expose personnel to dangerous fire conditions.
- Configure control unit to open water valves supplying water to monitor slowly so that piping fills slowly, thus preventing possible water hammer occurrence.
- After each use, and on a scheduled basis, inspect equipment per instructions in the Maintenance section.
- Any modifications to the electrical enclosures will destroy the NEMA 4 rating and void warranty coverage of the enclosure and all components within.

Important: Before installing and operating provided equipment, read this manual thoroughly. Proper installation is essential to safe operation.

SYSTEM INFORMATION:

Control Unit Serial Number: _____

Control Unit Accessories (Joystick Type, Type Of Signal Input Devices, Etc.): _____

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CHAPTER 1 GENERAL INFORMATION

1-1 Introduction

This manual contains the operation, installation, maintenance, troubleshooting, and parts list information necessary to support the HydroBlast HMI Remote Control Unit for managing the functions of the HydroBlast washdown monitor system (hereinafter referred to as the "HydroBlast").

1-2 System Description

The HydroBlast washdown system is an automatic remote controllable industrial washdown monitor (cannon) system which performs wash operations with high flow pressurized water based on customer defined pre-programmed wash sequence.

The Remote Control Unit offers touch screen HMI as well as a Joystick that are used to manage the vertical and horizontal movements of the monitors as wells as valve open and close operations. The controller is capable of storing movement pattern information and having the monitors execute those patterns simultaneously. The controller hardware offers a variety of external communication capabilities such as CAN and EtherNet/IP

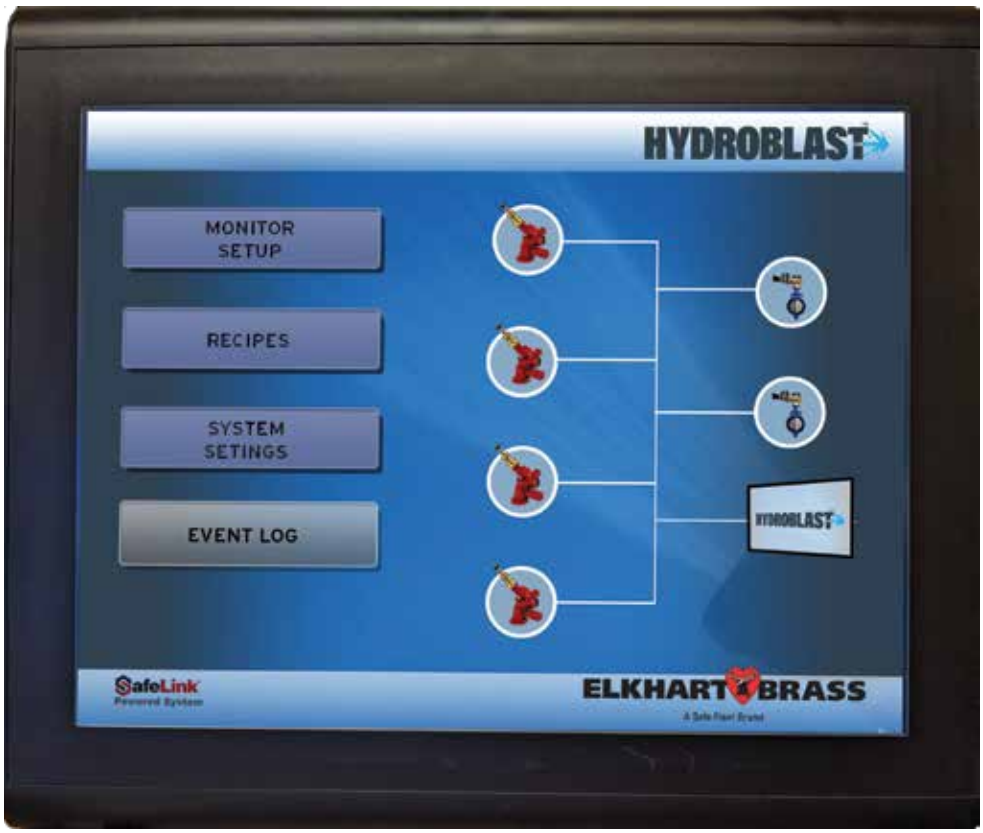


Figure 1-1 Illustrates the HydroBlast HMI Remote Control Unit

Figure 1-1 HydroBlast HMI Remote Control Unit

CHAPTER 2 TERMINOLOGY AND CONCEPT

2-1 Water Cannon and Monitor

These two terms are used synonymously and refer to a hardware device that has an input source for water and an output nozzle that can be positioned to direct the flow of water in a specific direction.

2-2 CAN

Controller Area Network (CAN) is a robust and reliable two wire communication protocol that is industrial grade and used across a range of industrial automation and vehicular applications. The controller and joystick communicate with the Monitors over a CAN network.

2-3 HMI

In the context of this document a Human Machine Interface (HMI) is used to refer to the Touch-Screen LCD device that is part of the user interface for the controller.

2-4 Pattern

A Pattern is a series of sequential movements executed by a Monitor. A Pattern is specific to a Monitor. A Pattern can have up to fifty (50) movement steps. Once a Pattern is created for a Monitor and associated with a Recipe (see Recipe definition below), that Pattern remains associated with that Recipe, even if a new Pattern is created for the same Monitor for use with another Recipe.

2-5 Recipe

A Recipe is a collection of Patterns for one or more Monitor. A Recipe can have exactly one Pattern for each Monitor participating in the Recipe. A Recipe concurrently launched on the Monitors participating in the Recipe with each Monitor executing the Pattern associated with it in the Recipe definition. A single Recipe can have up to 16 Monitors (depending on site configuration).

2-6 Micro SD CARD

This refers to a Micro SD card formatted as a FAT32 file system and of at least 8 GB capacity, that is used by the HydroBlast application for persistent data storage. The Micro SD card is inserted into a Micro SD port on the back panel of the HMI + Controller Unit.

2-7 Network ID

This is a numeric value between 1 and 16 using which the application addresses Monitors on the CAN bus. It is important to note that each monitor is set up with a unique number, referred to as the group number, between 0 and 15 with zero being the logically first monitor.

The Network ID = Monitor Group Number + 1

For Example, if a site has 4 monitors on the CAN bus, the Network ID's should be 1, 2, 3 and 4 and the Group Numbers would be 0, 1, 2 and 3 respectively.

CHAPTER 3 LAUNCHING HYDROBLAST

3-1 Introduction

Powering up the HMI (which includes the controller) will cause the controller software to be launched and the main HydroBlast application screen is displayed as shown in figure 3-1 below.

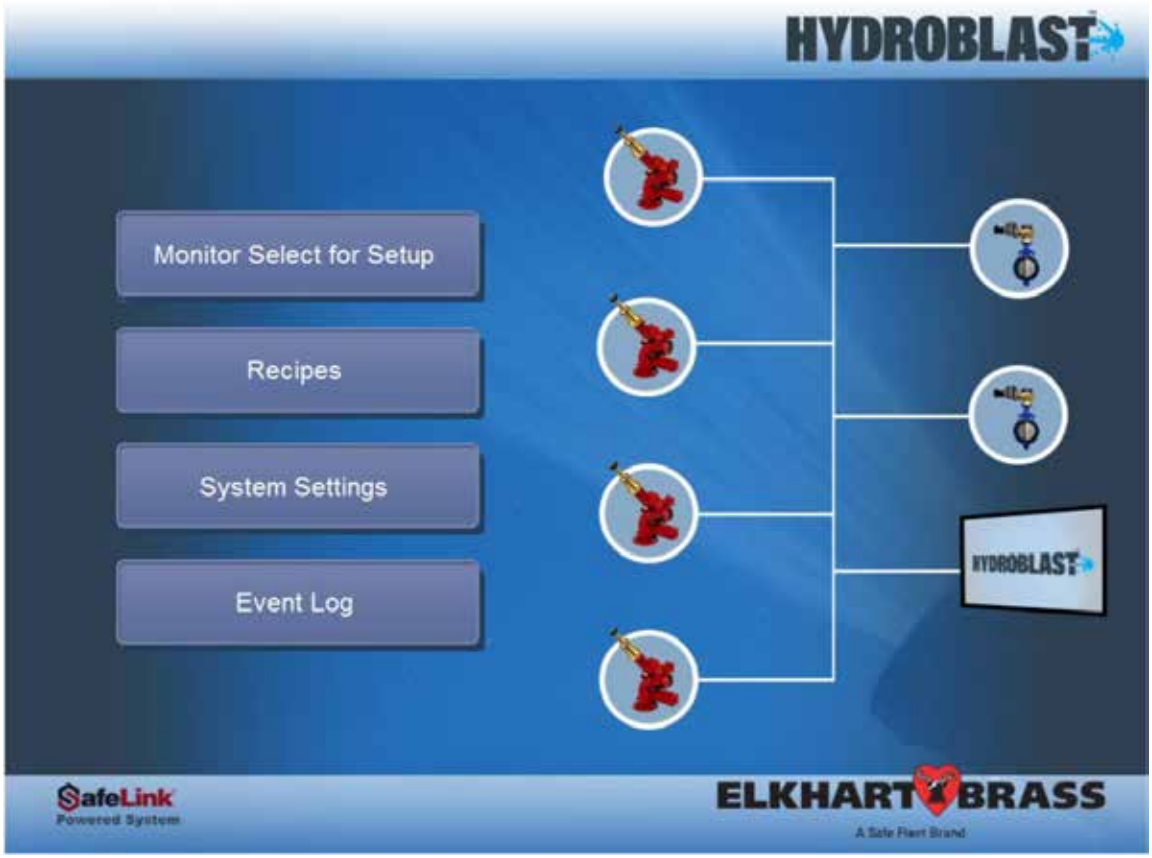


Figure 3-1 HydroBlast application screen

3-2 Using the HydroBlast Main Screen

The main screen also referred to as the home screen of the HydroBlast application is primarily a set of touch screen buttons that provide access to the various features and functionality of the application. The screen has the following buttons

1. Monitor Select for Set Up

This is used to access the screens which provides the capabilities of setting up information associated with each Monitor

2. Recipes

This is used to access the screen using which the end user can define Recipes.

3. System Settings

This leads to a system configuration interface, typically used by an administrator to set up default values and parameters for the various feature of the application.

4. Event Log

This leads to a screen using which various event notifications can be viewed.

3-3 Using the Soft Keypad

The application has a soft keypad for data entry of ASCII text and numeric characters. The soft key pad has an enter button and an escape button. Clicking/tapping on a data entry box will cause the soft keypad to be displayed. To make the application accept the data click on the enter button. To cancel the data entry click on the escape button.

3-4 Setting Up Monitor Information

Figure 3-2 HydroBlast monitor setup screen

1. From the main screen click on the Monitor Select for Set Up button.
2. The Monitor Set Up screen is displayed. The screen has
   - Sixteen Monitor icons (the number of Icons enabled depend on the number of units supplied to the customers)
   - A button marked Auto Detect
   - A button marked Recipes
   - A button marked Back
   - Click on icon marked Monitor 1.
3. A Monitor information set up screen appears for Monitor 1

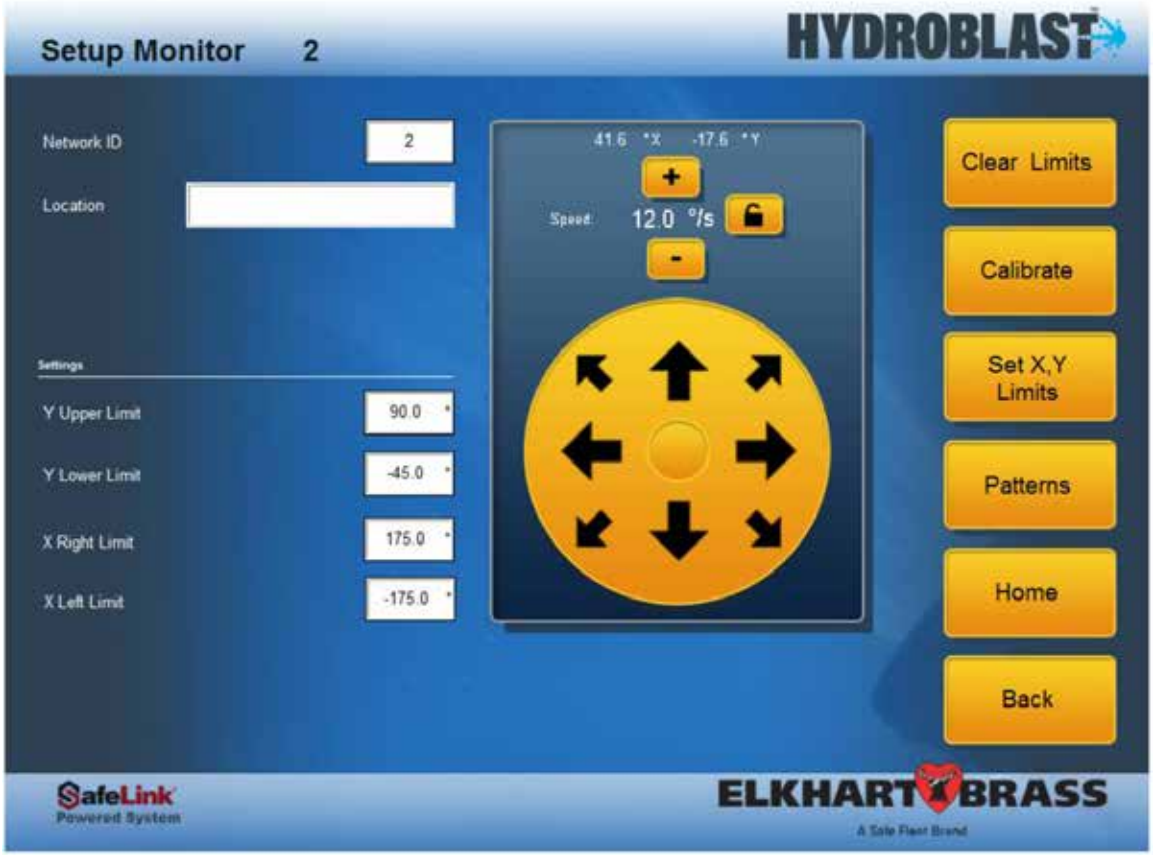


Figure 3-3 HydroBlast monitor setup

4. Click on the white data entry box marked Network Id. A software key pad appears.
5. Assign the appropriate Id to the Monitor using the soft keypad and click on the Enter button. The network id is a value between 1 and 4.
6. Click on the white data entry box marked Location.
7. The soft key pad appears.
8. For informational purposes enter in where the Monitor is located, using the soft keypad and click on the Enter button.
9. Click and hold one of the directional arrows down (e.g. the Up arrow or Down Arrow) for 2 seconds. The Monitor with network Id 1 should show a movement in the requested direction (assuming it has not already reached a limit in that direction). If the Monitor responds with movement in the expected direction, the Monitor is configured and available for use.

10. Click on the Back button to return to the Monitor selection screen to set up the next Monitor.
11. Once all Monitors have been set up with information use either Back button (if on Monitor Set Up Select screen) or the Home button (if on the individual Monitor Set Up Screen), to return to the Main or Home screen.

3-5 Creating a Movement Pattern

Figure 3-4 HydroBlast pattern setup screen

1. From the main screen click on the Set Up button to go to the Monitor Select for Set Up Screen.
2. Click on the icon associated with the Monitor for which the Pattern is to be built.
3. The Monitor specific set up screen will come up.
4. Click on the Patterns button
5. The Patterns screen will come up.
6. Use the Plus (+) and/or Minus (-) button to set the desired speed for the Pattern.
7. Click on the "Record Pattern" button to initiate the Pattern building process. The button will change to a lighter color indicating the system is ready to record movements.
8. Use either the Joystick and/or the directional arrows to move the Monitor. As the Monitor move the system records the movement positions.
9. Click on the Record Pattern button to end the recording. The Pattern is now associated with the selected Monitor.

3-6 Execute a Pattern

While on the Patterns screen for a Monitor

1. Click on the Execute Pattern button.
2. The Monitor will start directional movements per the Pattern selected.
3. Click on the Execute Pattern button again to stop execution at any time.

3-7 Setting Up a Recipe

Figure 3-4 HydroBlast recipe setup screen

Note: Before a Recipe can be set up at least one Pattern must have already been defined/recorded for each Monitor that will participate in the Recipe.

1. From the Main Screen click on the “Recipes” button.
2. The Recipe screen comes up.
3. Click on any one of the 12 Recipe buttons to associate a Recipe with.
4. Click on the Short Name text box to provide a text name for the recipe. Once the recipe is saved, this name will be displayed on the selected recipe button.
5. For each Monitor that is to be included in the Recipe, click on the check box next to the Monitor Icon.
6. Click on the “Save” button to save the Recipe

If a Monitor is to be included in the Recipe and either that Monitor does not have an existing pattern associated with it OR a new Pattern is desired for the Monitor:

1. Click on the specific Monitor Icon
2. The Monitor Pattern creation screen will appear.
3. Record a fresh pattern for the Monitor.
4. Save the Pattern and return to the Recipe screen to continue working with the Recipe.

3-8 Execute a Recipe

1. While on the Recipe screen select the Recipe to be executed by the Monitor(s).
2. Click on the Run button.
3. The Monitor(s) participating in the Recipe will start directional movements base on the Pattern associated with the Monitor in the Recipe.
4. Click on the Stop button to stop Recipe execution at any time.

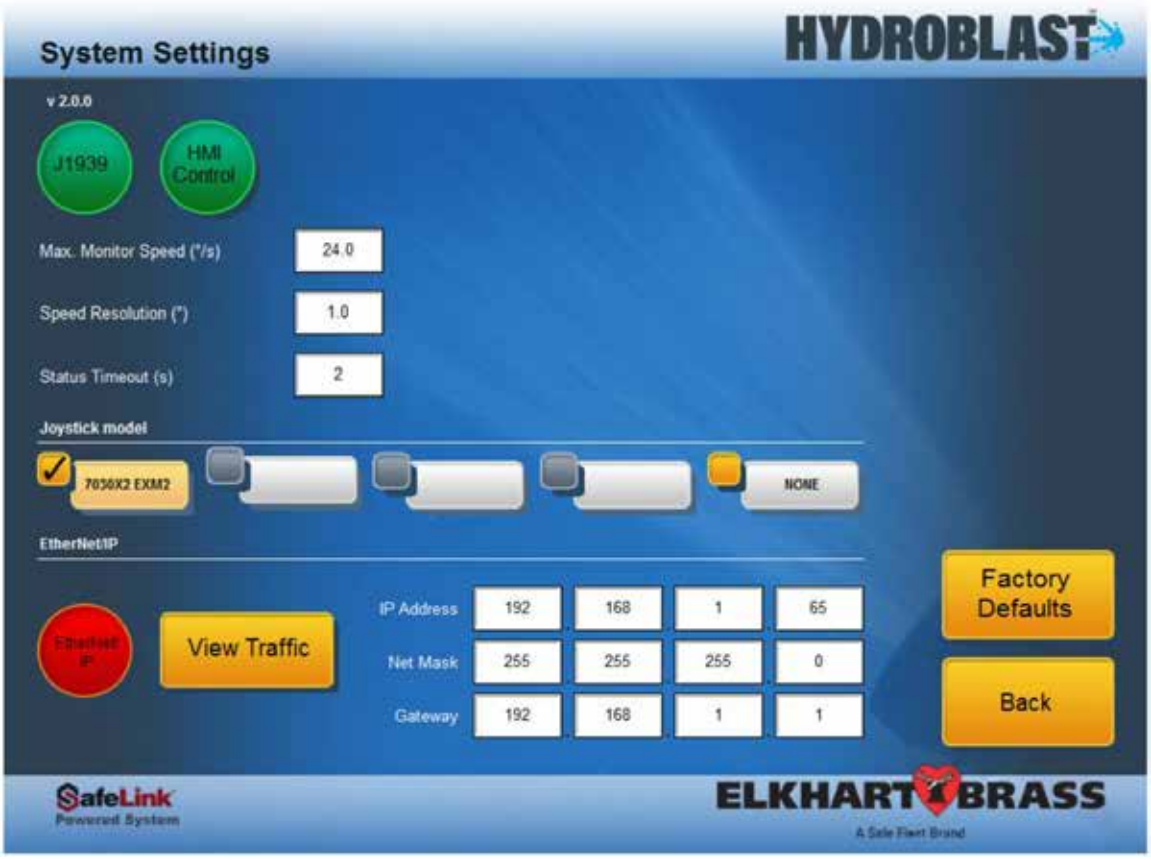
3-9 Ethernet/IP

HydroBlast supports communication over EtherNet/IP protocol. External PLC and other devices can send commands to the HydroBlast controller using a pre-defined message format over EtherNet/IP. The External device is considered the Originator and HydroBlast the Target. HydroBlast receives EtherNet/IP traffic as a Consumer and interprets the command/ message received over EtherNet/IP and then controls the Monitors accordingly. HydroBlast also sends back status and feed back message as producer to the external device.

For information on configuring an Allen Bradley PLC to communicate with HydroBlast over EtherNet/IP please refer to HydroBlast EN_Ethernet_IP.pdf document

To Enable the EtherNet/IP Feature

1. Tap on the Settings button on the Home screen.
2. The Settings screen will be displayed
3. Locate the EtherNet/IP section.
4. Specify the network configuration for HydroBlast as follows
   - A Static IP address that will be assigned to the HydroBlast unit
   - A Netmask based on the network/sub-net that HydroBlast is connected to
   - A Gateway (if any) required to direct traffic over a TCP/IP network
   - These inputs are in the IPv4 format XXX.XXX.XXX.XXX
5. Locate the button marked EtherNet/IP.
6. If the button color is Red that means EthernNet/IP is disabled and green if it is already enabled.
7. Tap on the button to enable/disable EtherNet/IP as desired.

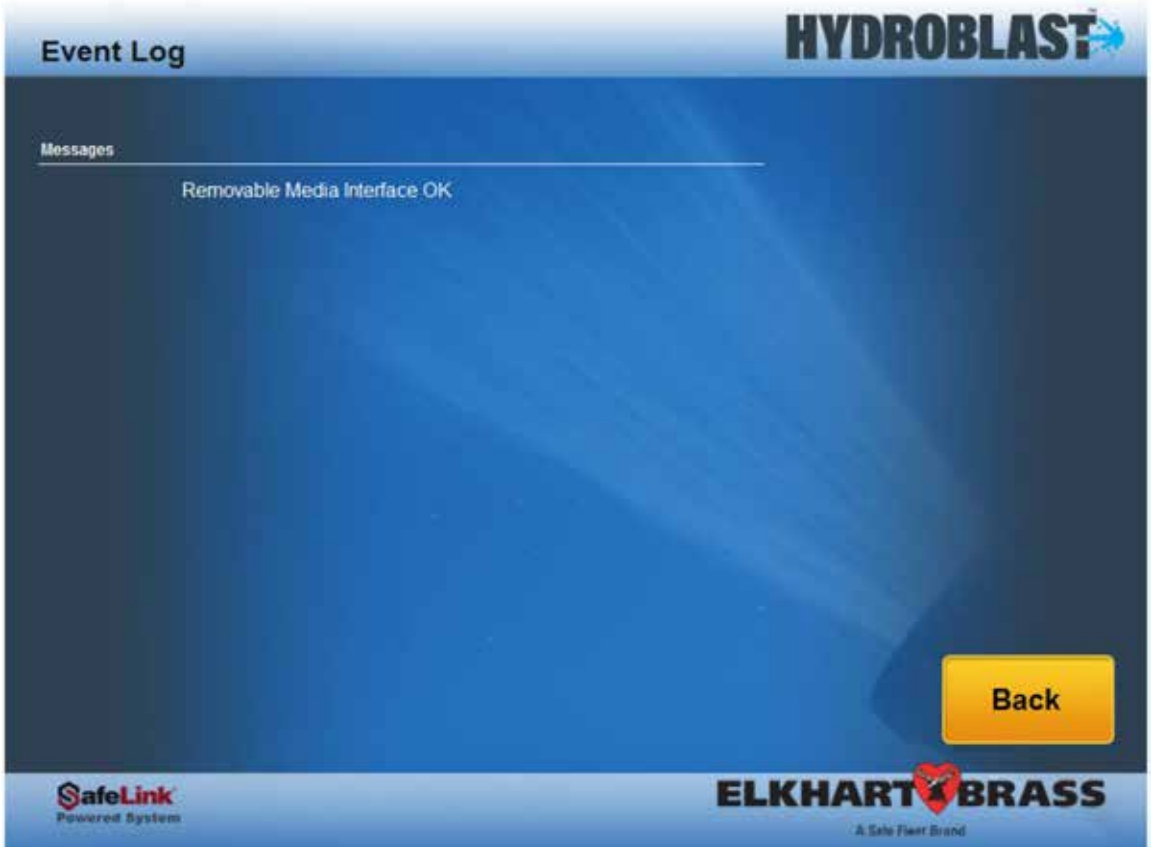


Viewing EtherNet/IP Traffic

This feature is intended for diagnostics/troubleshooting and allows viewing of the incoming/outgoing EtherNet/IP data words. To view traffic

1. Go to the settings screen.
2. In the EtherNet/IP sections there is a button marked “View Traffic”.
3. Tap on the “View Traffic” button.
4. The screen showing the Consumed and Produced data is displayed.

3-10 EventLog



3-11 Calibration

Calibration is the process of:

- Establishing an origin for the coordinate system to be used by the Monitor for movement measurements. Origin calibration establishes what the position of the Monitor would be when its coordinates are set to X = 0 Degrees and Y = 0 Degrees.
- Establishing the default horizontal and vertical limits of movement. Typically, -175 degrees to the left and +175 degrees to the right. And 90 degrees to the top and -45 degrees to the bottom.

Before a Monitor can be calibrated, it must have been configured with a Network Id.

To calibrate a Monitor:

1. On the Main/Home Screen Click on the Monitor Select Button
2. A screen showing 16 Monitor Icons Shows up
3. Click on the Monitor Icon to Calibrate that Monitor
4. A set up screen for the Monitor comes up
5. Click on the Clear Limits Buttons
6. The X and Y limits should show as cleared on the screen or there should be a message indicating the Monitor is not calibrated.
7. Use the horizontally left and right navigation arrows to align the arrow/marking on the monitor body with the corresponding marking on the flange
8. While keeping the markings aligned, use the vertically Up or Down navigation arrow to move the monitor nozzle such that it is perpendicular with the horizontal/ground.
9. Now click on the Calibrate button.
10. The Monitors X limit will be set to -175 and +175 and Y limits will be set to -45 and +90.

3-12 Set User Limits

User Limits are user defined values for limiting the movement along the horizontal and vertical axis. User Limits determine how far to the left or right and up or down the monitor can be moved.

Before a limit can be set for a Monitor, it must have been configured with a Network ID.

To set user limits:

1. On the Main/Home Screen Click on the Monitor Select Button
2. A screen showing 16 Monitor Icons Shows up
3. Click on the Monitor Icon to set up User Limits for that Monitor
4. A set up screen for the Monitor comes up.
5. Specify the
   a. Y Upper Limit (typically in the range of -45 to 90 degrees)
   b. Y Lower Limit (typically in the range of -45 to 90 degrees)
   c. X Right Limit (typically in the range of -175 to 175 degrees)
   d. X left Limit (typically in the range of -175 to 175 degrees)
6. Click on the Set X, Y Limits button.

The specified limits will be used to restrict the Monitors movements.

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