

# Installation, Operation and Maintenance Instructions



## PROSORT II

**ERIEZ MAGNETICS** HEADQUARTERS: 2200 ASBURY ROAD, ERIE, PA 16506-1402 U.S.A.  
*WORLD AUTHORITY IN SEPARATION TECHNOLOGIES*

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# Installation

## Machine Installation:

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### **WARNING**

**If welding is required during the machine installation, the ProSort II must be properly grounded to the foundation. In no circumstance should a ground loop be made through either control box or any cabling leading to or from either control box. Failure to properly ground the machine can result in damage to critical control components.**

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Only qualified personnel should install the Eriez ProSort II Machine.

The Eriez ProSort II is comprised of a Brute Force feeder, conveyor with metal sensors, paddle array on a support rack, and discharge hood with adjustable splitter. The support rack, discharge hood, and conveyor are mounted on a common frame. The feeder is mounted on a separate frame. This is illustrated in the attached outline drawing 4R-201007668.

Avoid damaging the equipment during installation. Make certain that the screen display on the control is covered with a rigid protection cover (wood or cardboard with padding against the screen) to avoid damaging the screen during installation. Inspect the equipment for any damage during shipment. Check inside both control boxes for concealed damage to terminal boards, etc.

When moving the conveyor use the lift lugs provided on each corner of the conveyor. Use a spreader bar to avoid damaging the conveyor frame. If moving an entire system (conveyor, paddle rack, and discharge hood) mounted on a common frame, only use the common frame lift lugs to move and install the equipment. For ease installation the paddle rack can be removed from the common frame.

In general, the vibratory feeder can be shipped either loose or with the isolation springs blocked on the frame to ensure that the feeder does not bounce around during shipping. Straps are provided at the mounting springs to anchor the feeder to the frame. When lifting the feeder and feeder frame, use only the lift lugs on the frame.

All conveyor legs and vibratory feeder stand frame legs should be supported rigidly from below. Failure to provide an adequate foundation under each vertical column can result in vibration transmitted through the frame to control equipment. Excessive vibration (acceleration levels greater than 1G) can cause premature electronics failures. Both attached outline drawings illustrate the locations under the ProSort II support frame where rigid foundation supports are required. The customer is responsible for the support structure beneath the ProSort II machine.

When preparing to bolt the ProSort II unit in the installation, shims should be used to insure that all legs are sitting on a firm surface. The ProSort II conveyor, vibratory feeder tray, and paddle rack should be level and square. If necessary, adjust for level and square with shims beneath the ProSort II common frame and feeder frame at each vertical foundation support location. Do not pull bolts to frame by tightening, but shim from mounting surface to each leg to prevent twisting of the frame when hold down belts are tightened.

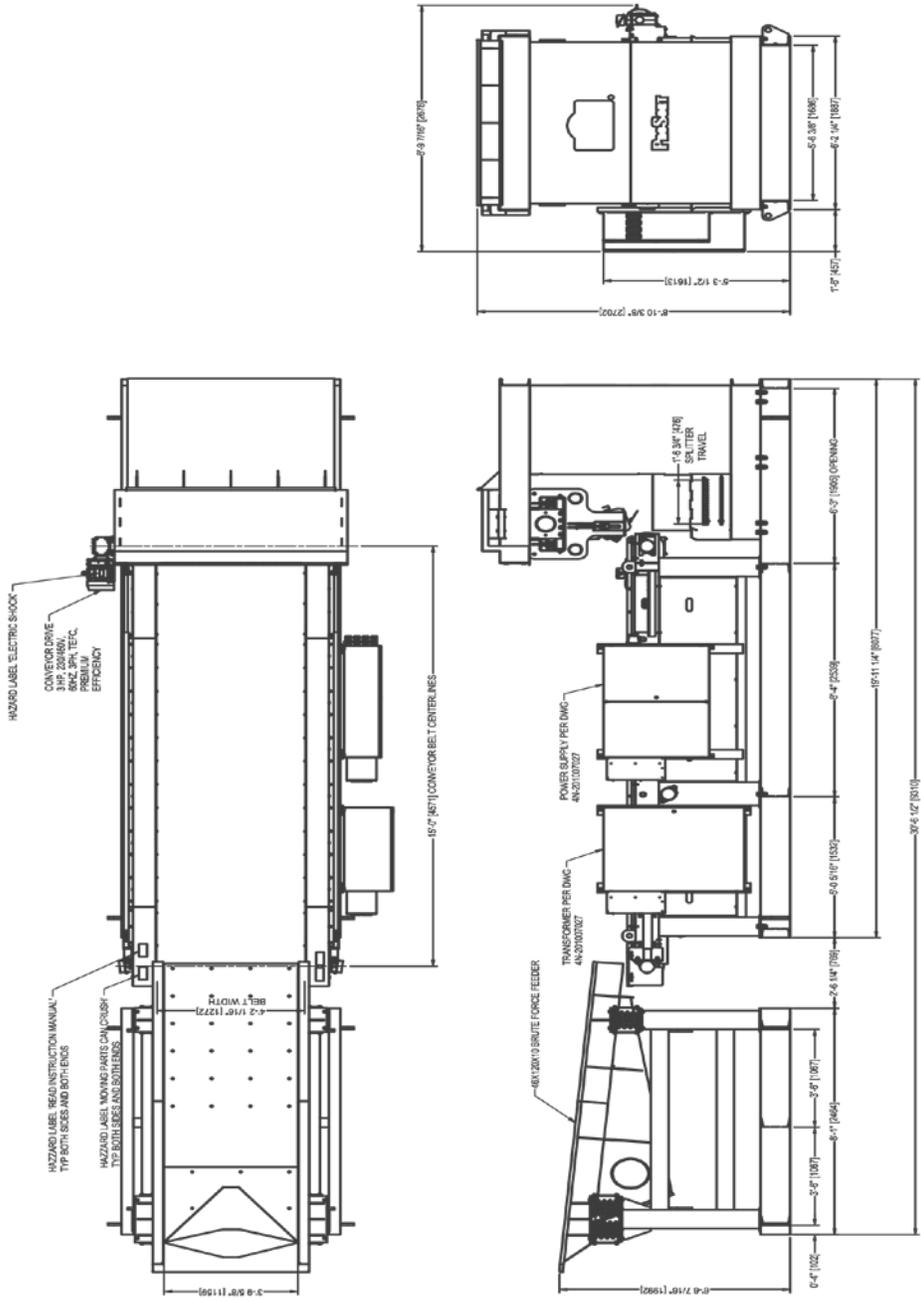
## Electrical Installation:

Only qualified personnel should make the electrical connections between the ProSort II and the line source. Consult local electrical codes for proper installation. Ensure that the electrical supply matches the ratings on the unit's nameplate.

Refer to the Electrical Control Section for the schematics that illustrate the terminal locations and ratings of the line source. There is a schematic included inside each control box for reference. Also, refer to the schematics in the Electrical Control Section for the terminal locations for the vibratory feeders and any other equipment that requires a wired connection inside the control boxes. Control boxes contain thermostatically controlled heaters for cold operation of displays that require a separate power source.

Make certain to take all safety precautions (lock out/tag out) to ensure safe electrical connection to the line source. The installation of a fused safety switch or branch circuit breaker(s) ahead of the ProSort II control is recommended.





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**DETAILS**

REV.	DATE	DESCRIPTION
001	03.22.2013	2013
002	03.22.2013	2013
003	03.22.2013	2013
004	03.22.2013	2013
005	03.22.2013	2013
006	03.22.2013	2013
007	03.22.2013	2013
008	03.22.2013	2013
009	03.22.2013	2013
010	03.22.2013	2013

NOTES: SEE DRAWING AND THE PRINCIPLE OF DESIGN FOR THE POSITION OF AND DIMENSIONS TO EDGE

**4R-201001668**

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NOTES:  
 1. 1/2" SUPPORT FRAME: 5000 LBS (2268)  
 2. 1/2" SUPPORT FRAME: 3000 LBS (1361)  
 3. CONVEYOR: 5000 LBS (2268)  
 4. FINGER RACK & DISCHARGE: 3000 LBS (1361)  
 5. SUPPORT FRAME: 2000 LBS (907)  
 6. BELT: 2000 LBS (907)  
 7. BELT SPEED (VARIABLE): 400-500 RPM  
 8. PAINTER: 2000 LBS (907)

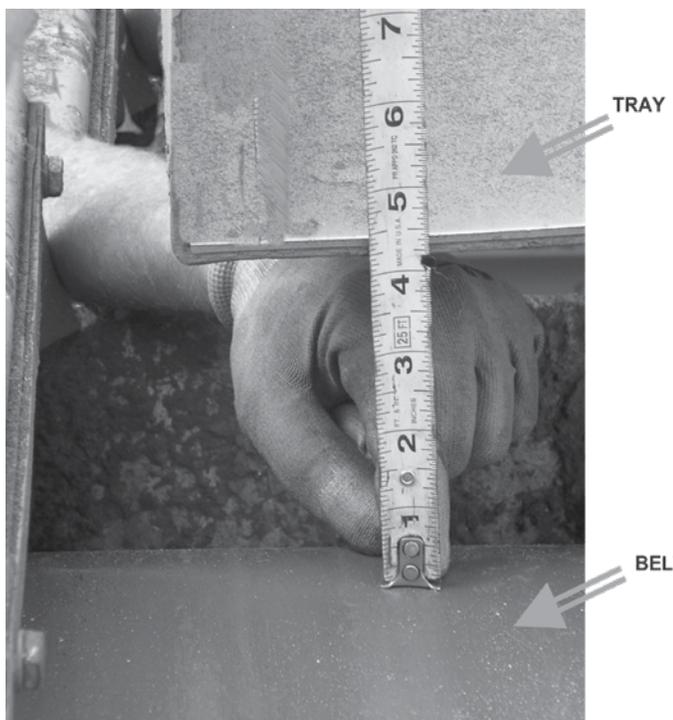
REV.	DATE	DESCRIPTION
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002	03.22.2013	2013
003	03.22.2013	2013
004	03.22.2013	2013
005	03.22.2013	2013
006	03.22.2013	2013
007	03.22.2013	2013
008	03.22.2013	2013
009	03.22.2013	2013
010	03.22.2013	2013

## Clearance Check:

Prior to starting the machine, make certain that all tools are removed from the feeder tray and belt, and make certain that the control boxes are locked.

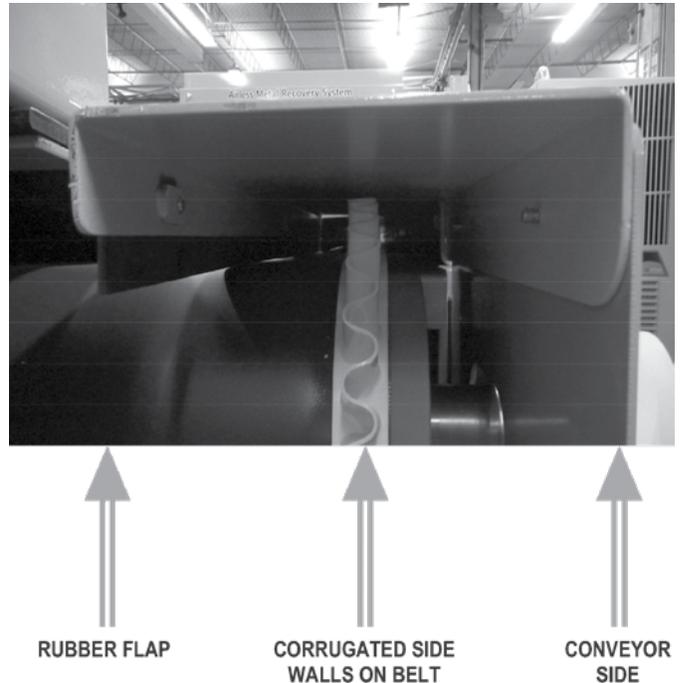
Before starting the ProSort II, check to make certain that there are no interferences in the following areas:

1. Conveyor belt and vibratory feeder tray (**FIGURE 1-1**):
  - There should be at least 4 inches of clearance between the bottom corners of the tray and the conveyor belt.
  - The feeder should be centered between the conveyor sidewalks.
2. Vibratory feeder and the foundation:
  - There needs to be at least six inches of clearance around the perimeter for the vibratory feeder to ensure that the feeder does not strike anything during the start-up and shutdown transient.
  - Sway the vibratory feeder by hand to make certain that the feeder moves freely and does not strike anything.

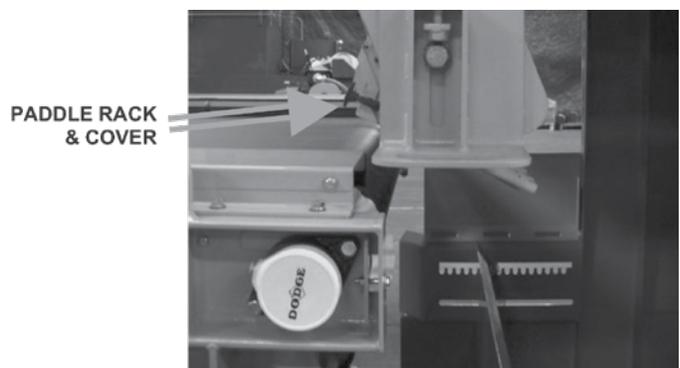


**FIGURE 1-1: BELT / TRAY CLEARANCE**

3. Corrugated sidewalks on the conveyor belt:
  - The conveyor side guides (**FIGURE 1-2**)
  - The rubber flap on the side guide. The belt tracking should be adjusted to eliminate this interface (**FIGURE 1-2**)
  - The top cover of the paddle rack. This can be visually inspected on each corner of the conveyor (**FIGURE 1-3**)



**FIGURE 1-2: BELT / SIDEGUIDE CLEARANCE**

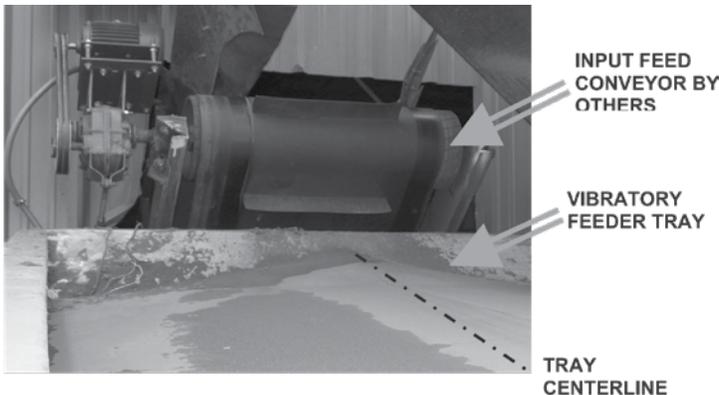


**FIGURE 1-3: BELT / PADDLE RACK CLEARANCE**

## Feed Conveyor Positioning

The ProSort II vibratory feeder tray is designed to spread material across the bottom surface of the tray before the material discharges to the ProSort II conveyor belt. There are two styles of tray designs. One style has a hip that extends the length of the tray and the other style has a crowned dome on the inlet side of the tray. For either design, the customer's belt conveyor that introduces product to the ProSort II vibratory feeder tray must be positioned to drop the product on the rear center of the tray so that the product is equally split on both sides of the hip running the length of the feeder tray or on the center of the crowned dome. **FIGURE 1-4** illustrates an ideal installation where the customer supplied belt conveyor introduces product from the rear of the tray.

Failure to properly introduce the product to the ProSort II vibratory feeder will result in non-uniform feed across the ProSort II conveyor belt. This can compromise the quality of the separation.



**FIGURE 1-4: INPUT FEED BELT CONVEYOR CENTERED OVER VIBRATORY FEEDER TRAY**

## Start-Up

After the initial inspection, each piece of equipment must be operated independently for a functional inspection. Make certain that the main power switch on the control boxes are in the *OFF* position, and push in the red *E-STOP* button prior to applying line power to the ProSort II. Next, apply line power to the ProSort II. Pull out the red *E-STOP* button on the ProSort II control, and turn the main power switch to the *ON* position. The touch screen display will become functional within two minutes of turning on the main power switch on the controls. Please note that the display will be blank (black screen) during this two-

minute interval.

The touch screen will display the MAIN tab where the user has the opportunity to operate each piece of equipment independently. There are two protection modes that allow varying degrees of access to the commands in this window. When in the *OPERATOR* mode, most of the setting and options are blocked to avoid unwanted setting changes and the user only has the ability to start or stop the entire system. When in the *MAINTENANCE* mode, the user has the ability to change all settings and operate equipment in various combinations or independently. The ProSort II is shipped to the customer with the MAIN tab unlocked to the *OPERATOR* mode, as displayed on the bottom right hand corner of the screen below the *PASSWORD* square.

To change the mode from *OPERATOR* to *MAINTENANCE*, touch *PASSWORD* square on the bottom right corner of the screen. A numeric keypad window will appear. Enter the series of numbers "3333" and touch *OK*. This will return the user to the *MAIN* tab. *MAINTENANCE* will be displayed on the bottom right hand corner of the screen below the *MAINTENANCE* square. At this point, the user can operate each piece of equipment on the ProSort II independently.

**NOTE: Refer to the *PASSWORD* section of this manual for further discussion on password settings.**

First, operate the ProSort II conveyor belt to make certain that the belt tracks without rubbing on the conveyor side guides. Press the ProSort Conveyor *START* box on the *MAIN* screen. Observe belt operation for 5-10 minutes. If the belt is drifting to one side, or not centered between the side guides, adjust the tension on the rear pulleys as outlined in the "General Maintenance" section.

After satisfactory operation of the conveyor belt is observed, shut the conveyor off via the *STOP* box in ProSort Conveyor box on the main screen. Next, perform a paddle diagnostics check to ensure that all of the paddles are operating properly. Press the PADDLE DIAGNOSTICS box using the tab at the top center of the screen to display the paddle diagnostics window. Refer to the *PADDLE DIAGNOSTICS* section of Screen Descriptions for touch screen navigational instructions to conduct a paddle diagnostics test.

Afterwards, run the paddle wave and visually inspect the paddles to ensure that they are all operating properly.

After verifying proper paddle operation, conduct a sensor diagnostics test to ensure that all of the sensors are functioning properly. Press the **SENSOR DIAGNOSTICS** tab at the top center of the screen to display the *SENSOR DIAGNOSTICS* window. Refer to the Sensor Diagnostics section of the Screen Descriptions for touch screen navigational instructions to conduct the sensor test. Press the **MAIN** tab on the top left corner of the screen to return to the main screen.

Next, start the vibratory feeder from the main screen by pressing the **START** button under the “ProSort Feeder Control” box. Observe the feeder operation from start-up to shut down. Start the vibratory feeder and watch it pass through the start-up transient (roughly 3 seconds). After the start-up transient, smooth operation should be observed without any sideways motion or erratic behavior. Verify that the vibratory feeder operates properly and does not contact the conveyor belt or the surrounding foundation/equipment during start-up and steady state operations. Shut the feeder off and observe the motion of the feeder as it passes through the isolator natural frequency. If the feeder contacts the conveyor belt, side guides, foundation or adjacent equipment, modifications must be made to increase the clearance between the feeder and adjacent equipment to eliminate contact during feeder operation.

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**⚠ WARNING: ALLOWING THE FEEDER TO CONTACT EQUIPMENT, CONVEYORS, OR THE FOUNDATION WILL EVENTUALLY RESULT IN FEEDER DAMAGE, AS WELL AS DAMAGE TO THE SURROUNDING EQUIPMENT. CLEARANCE ISSUES MUST BE RESOLVED BEFORE THE PROSORT II IS CONSIDERED OPERATIONAL.**

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Drop some product on the feeder tray and watch it feed to the conveyor belt. If the product does not feed properly off of the tray, or erratic behavior is observed during operation, check to ensure that the motors are properly wired so that the motors rotate opposite to each other. Refer to the troubleshooting section of this manual, and also Appendix 2 for the Brute Force

feeder for assistance in resolving this problem.

After confirming that each component on the ProSort II is functioning properly, the entire system is ready for operation. Refer to the **MAIN** Screen and press the **SYSTEM START** button. Shut the system off via the **OFF** button.

**NOTE: The screen access mode will automatically change from *MAINTENANCE* to *OPERATOR* within 10 minutes of operation to save any changed parameters. Refer to the Password section of this manual for further discussion.**

## General Operation

### Principle of Operation

The Eriez ProSort II separates metal from a product stream. Product is introduced onto the ProSort II conveyor belt from a vibratory feeder. The conveyor belt moves the product over a bank of inductive sensors that identify metal in the product stream. The identified metal travels to the end of the conveyor, and flies off of the belt under a line of paddles. Based on each sensor input, the respective paddle is activated to deflect the identified metal from the product stream.

There is a paddle at the end of the conveyor coupled with two metal sensors under the conveyor belt. Both the sensor and the paddle are linked together through the patent pending Eriez driver module. The driver module evaluates the analog voltage signal from the sensor, and identifies when the voltage level drops below an operator set voltage threshold limit. When a sensor output voltage drops below this limit, a software configurable travel time is started. The travel time allows a qualified person to adjust the time between sensor detection and paddle actuation to ensure that the paddle will deflect the metal out of the product stream at the moment that the metal is flying under the paddle.

Since different types of metals product different drops in the analog voltage signal from the sensor, the ProSort II machine can also be used to identify several different types of metals in the product stream. By adjusting the threshold limit between two voltage levels associated with two different



types of metals, one metal type that drops the output voltage signal from the sensor below the threshold limit will be kicked out by the paddle from the remaining metal that does not reduce the voltage signal below the threshold limit.

Driver modules handle the time critical functions of the system. Each driver module in the system (number of driver modules will depend on system size) is connected to a master embedded PC through a 485 connection. The embedded PC in turn is connected to a touch screen to provide a graphical user interface. The touch screen can therefore be used to change settings in each driver module and display data from each driver module.

## Optimizing Performance

There are five adjustable parameters to optimize ProSort II Separation;

1. Conveyor speed
2. Sensor voltage threshold
3. Travel time
4. Paddle Position
5. Splitter location

Adjusting any of these parameters can necessitate a change in the remaining four parameters to maintain optimum separation.

Conveyor speed, travel time and sensor voltage threshold (detect setup) are adjustable through the *MACHINE SETUP* window on the touch screen control. Refer to the *SCREEN DESCRIPTIONS* section of this manual to access this window. The paddles and splitter are manually set on the machine.

## Conveyor Speed

Material introduced onto the belt will travel over the metal sensors at the belt velocity “V”. A good starting point for belt speed is approximately 400 to 450 fpm. (FIGURE 2-1).

## Sensor Voltage Threshold

When metal travels over the sensor, the sensor output voltage level drops. The sensor voltage

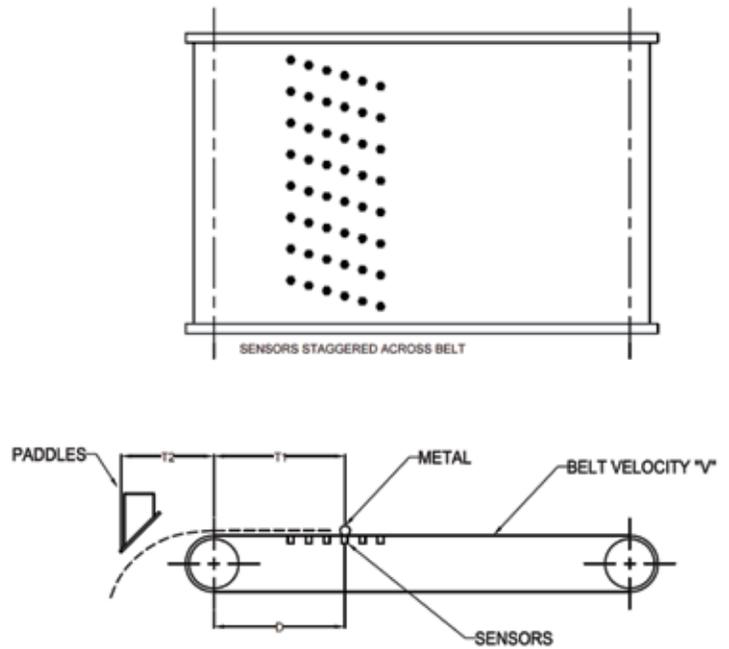


FIGURE 2-1: SENSORS AND TRAVEL TIME

## Paddle Location

Paddle position relative to the conveyor belt pulley is also adjustable in three directions. Vertical paddle position is adjusted with a screw jack on each side of the paddle bank. Loosen the bolt before turning the jackscrew (FIGURE 2-2). The paddle bank alone can be rotated about a pivot point roughly at the center of the paddles by loosening the bottom bolt on each side of the paddle bank and removing the top bolt locking the bank in position. Replace the top bolt after positioning the paddle rack (FIGURE 2-2). The horizontal rack position is adjustable by sliding the entire rack on the support frame. This is accomplished by loosening or removing the bolt mounting the rack to the support frame, and sliding the rack to the desired location, and placing the bolts in the slots that show a bolt hole in the support frame (FIGURE 2-3).

Proper paddle placement is critical to obtain good separation. Ideally, the paddles should be adjusted so that the trajectory of the material stream just makes it under the paddles without touching the paddle (FIGURE 2-1). Also, to ensure that the paddle deflects the metal backward more so than down, it is best to position the paddles so that the angle of the paddle relative to horizontal is greater

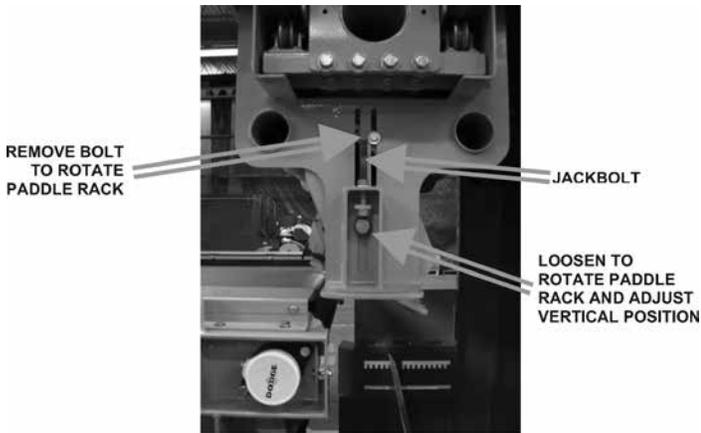


FIGURE 2-2: VERTICAL AND ROTATIONAL ADJUSTMENT OF PADDLE RACK

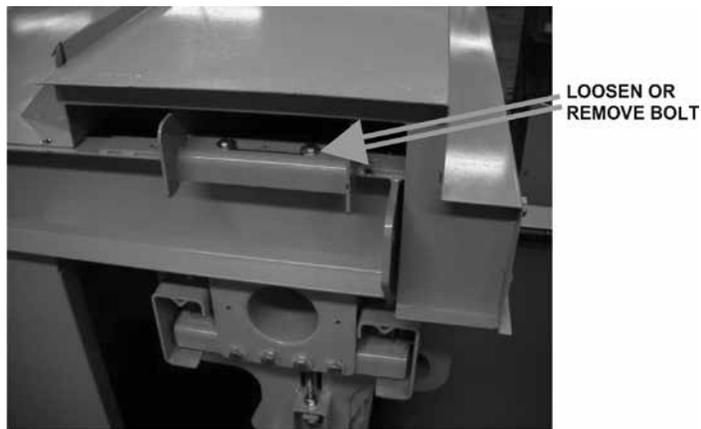


FIGURE 2-3: HORIZONTAL ADJUSTMENT OF PADDLE RACK

than 45 degrees. As the angle increases the paddle will kick metal backward more in the horizontal direction.

## Travel Time

The travel time is the delay time between when the sensors provide the driver module with a detect signal and when the paddles activate. This travel time consists of the belt time "T1" between the sensor and discharge pulley and trajectory time "T2" between the discharge pulley and the moment when the metal object is under the bottom section of the paddle. Time "T1" is a function of the belt speed and the distance "D" from the center of the pulley to each sensor. Note that the sensors are staggered across the width of the belt, so the distance "D" is different for each adjacent sensor. Trajectory time "T2" is a function of the belt speed and gravity. Note that as the belt speed increases, the horizontal and vertical paddle distance from the

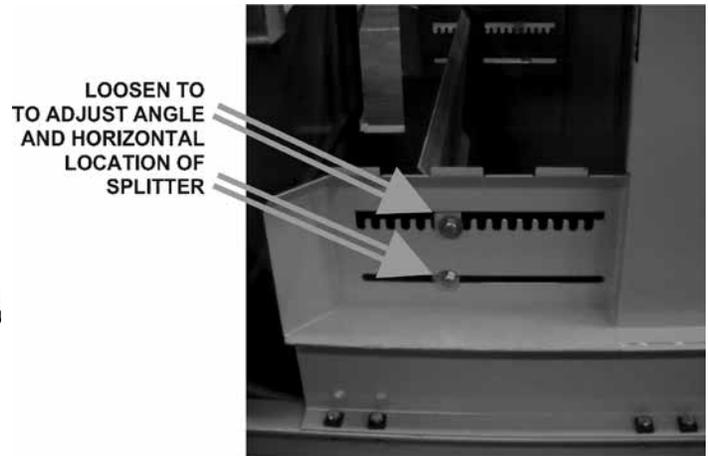


FIGURE 2-4: SPLITTER ADJUSTMENT

pulley also increases to optimize performance.

In general, it is best to set the travel time so that the paddle strikes the metal roughly 1 to 1-1/2 inches from the bottom of the paddle. This hit location can be evaluated by placing tape on the paddles and visually identifying the "scratch" spot. If the paddle is missing the metal, then reduce the travel time. If the paddle is hitting the metal too early, then slightly increases the travel time.

## Splitter Setting

Splitter location is also important to recovery and grade. The closer is the splitter is set to the conveyor, the lower the recovery, but generally the grade is higher (depending upon the product). This grade and recovery trade-off must be set by the end user to satisfy his/her requirements.

The horizontal location and angled position of the splitter can be adjusted in the discharge chute to accommodate the belt speed and product stream. Loosen the top and bottom bolts fastening the splitter to the hood. Rotate and adjust the splitter to the desired location.

# General Maintenance

## Cleaning:

The belt, paddles, and splitter should be inspected for debris that can hinder machine performance. This inspection should be performed on a daily basis between shifts and during planned/unplanned shut downs. All debris should be removed from the splitter and paddles. All the paddles should be free to move and swing the full 45-degree arc when actuated. Pressurized air should be used to clean the debris from between the paddles and paddle shield. Also, pressurized air should be forced underneath the shield from both sides to clean any debris that collected under the shield that could inhibit proper paddle motion.

## Bearings:

Refer to the outline drawings 4R-201007668 in section 1 and note that there are six bearings, three per side on the main conveyor. The Brute Force feeder bearings may be lubed for life. Refer to Appendix 2 for the grease intervals and specifications if required.

Grease the conveyor belt bearings every 2 weeks. Lubrication intervals and specifications are provided in Appendix 6.

Refer to Appendix 3, 4 and 5 for lubrication intervals and specifications for gear reducers and reducer drive motors.

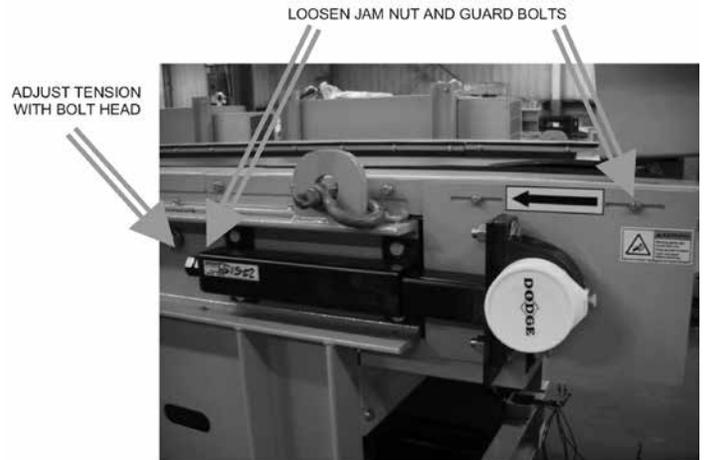
## Belt:

Inspect the belt on a daily basis for holes and alignment.

If the belt is not tracking properly, the belt can be adjusted by increasing or decreasing the belt tension bolts at the rear corners of the belt. The belt tension is adjusted on the telescoping bearing mounts on the back of the conveyor (**FIGURE 3-1**). Note that the jam nut must be loosened before adjustment, and re-tightened afterward. Increasing the belt tension on one side of the belt will force the belt to track away from this side. Decreasing the belt tension on one side will draw the belt closer to

this side. It is best not to over tension the belt on one side, but instead attempt to adjust the belt track by adjusting both sides until the belt is tracking down the middle of the pulley.

Minor belt damage can be repaired with a repair kit offered by Eriez. Instructions are provided in the kit for belt preparation and repair.



**FIGURE 3-1: BELT TENSION ADJUSTMENT**

## Brute Force Feeder:

Lubricating the motor bearings (if required) according to the guide in Appendix 2. Check the tray stroke periodically to ensure that the feeder is operating properly. These brute force feeders are usually tuned for 3/8 to 1/2 inch tray stroke.

Check and clean any build-up that may occur on the tray surface on a periodic basis. An extreme build-up on the tray surface can reduce tray stroke and alter material feed along the tray surface. Remove buildup as necessary.

## Operational Tests:

Sensors and paddles should undergo an operational test to ensure that the ProSort II is providing optimum separation.

### Paddle Test:

Conduct a paddle diagnostics test on a periodic basis to ensure that all paddles are operating properly. Refer to section 4 (Troubleshooting Guide) to conduct this test.

If a paddle is damaged or malfunctioning and it must be removed from the machine for further maintenance, refer to the Troubleshooting section for removal and installation instructions. Refer to section 4 for further instructions for paddle repair.

### Sensors:

The following sensor test should be done on a periodic basis to verify the proper operation of the sensors:

1. Remove all metal from the ProSort II Conveyor belt.
2. Go to the “Sensor Diagnostics” screen.
3. Press the “Latch” check box if it is unselected.
4. Press the “Detect” button.
5. Press the “Clear All” button.
6. Verify that all sensors are NOT “in detect”. Each sensor control should look like the following figure, wherer X will be the sensor number:



If any sensor has the word **Detect** in the control, then please verify that all metal has been removed from the belt. If metal is on the belt, start from step 5. If no metal is on the belt, see the Sensor is continuously in “Detect” item in the troubleshooting section (section 4).

7. Move a 4-inch (102 mm) or larger piece of metal over the top of each sensor. Please note that each sensor is inline with a paddle, but there are several rows of sensors. Therefore, the easiest test piece to use is a long steel rod approximately ½-inch (12.7 mm) diameter by 3-foot (914 mm) long that can be rolled over the width of the belt in the area of the sensors. See Figure 2.1 (Section 2) for sensor locations.
8. After the metal is run over each sensor, verify that each sensor control indicates detection. Each sensor control should look like the following figure, where X will be the sensor number:



If any of the sensors do not say Detect, please repeat step 7. If the problem persists, please call Eriez.

9. If all the prior steps are completed successfully, then the sensors are operating normally.

### Control Box Cooling Units:

Air coolers are installed on control boxes for operation in warmer climates. These control box cooling units remove heat from the control boxes by passing cooler external air over a heat exchanger that draws heat from the inside of the control box.

To ensure that these cooling units function properly, make certain that there is no debris sticking to the inlet or outlet vents that inhibits airflow through the vents.

### Control Box Heater Units:

Thermostatically controlled heater units are installed in the control boxes for operation in cold climates, VFC display screens inside the control boxes may not function properly if the internal temperature drops below 32°F (0°C).

The heaters must be connected to a separate power source (see electrical schematic diagrams) to allow for heater operation overnight if the temperature falls below 32°F (0°C). The heater thermostats are factory set at 40°F (4°C) heater operation is only necessary if the ProSort II is shut down. If the ProSort II is not shut down, enough heat should be generated to keep the internal box temperature about 32°F (0°C).

# Troubleshooting Guide

Only a qualified technician should troubleshoot the ProSort machine. Take all safety precautions to avoid injury or machine damage. Refer to section 6 for the password information to allow access to diagnostics codes to assist in troubleshooting the ProSort.

**The first step in troubleshooting is to look for pop-up messages or messages shown in the “Control Panel” area of the display. If a fault is indicated, then please see the “Faults” screen for more details.**

## Settings

### Problem: Unable to change settings

1. Some settings are locked for limited access.
2. Set the ‘Passwords’ topic in the General Operation section for more details.

## Paddles

### Problem: None of the Paddles are actuating

1. Go to the “**Main**” screen. (Some of the screens need to turn off the normal detection operation). Please see the ‘Detect OFF’ item in the “**Control Panel**” screen description.
  - a. If the problem still exists, go to step 2.
2. The detection threshold may not be appropriate for the metal being currently run on the system. Please see the “Detect Setup” item in the “**Machine Setup**” screen description.
  - b. If this does NOT correct the problem, please call Eriez for assistance.

### Problem: A single Paddle is not actuating

1. Go to the “**Paddle Diagnostics**” screen.
2. Press the ‘**Paddle Test**’ button. Please refer to the ‘Paddle Test’ item in the “Paddle Diagnostic” screen description.

### Problem: A Paddle is continuously actuating without material on the ProSort conveyor belt

1. Determine the number of the paddle that is not working. The paddles are numbered from

left to right when standing in front of the paddle rack.

2. Go to the “**Sensor Diagnostic**” screen.
3. If the ‘Latch’ check box is selected, press it now to unselect it.
4. Press the ‘Deselect’ button.
5. Look at the sensor corresponding to the paddle found in step 1.
  - a. If the sensor is continuously in detect (See figure below), then follow the “Sensor is continuously in ‘Detect’” steps.



- b. If the sensor is NOT continuously in detect (See figure below), then call Eriez for assistance.



- c. If the sensor is changing from detect (See figure in step 5.1) to NOT detect (See figure in step 5.2), then follow the “Sensor is continuously in ‘Detect’” steps.

## Sensor

### Problem: Sensor is continuously in ‘Detect’

1. Verify that all metal is removed from the sensor area of the belt. If the problem has NOT been corrected, then go to step 2.
2. Record the metal name in the ‘Metal Type’ control on the “**Main**” screen. This will determine the metal type that is currently being run on the system.
3. Go to the “**Machine Setup**” screen and record the threshold in the ‘**Detect Setup**’ for the metal type found in step
  - a. If the threshold is greater than 9.0V. The threshold should be changed to 9.0V or less. If this does NOT correct the problem,

go to step 4.

4. Go to the “**Sensor Diagnostic**” screen.
5. If the ‘Latch’ check box is selected, press it now to unselect it.
6. Press the ‘**Voltage**’ button. The system will now show the current voltage measured on each sensor.
7. Look at the control for the desired sensor.
  - a. If the voltage on the sensor is less than 0.5V, replace the sensor. See **Sensor Replacement**. If replacing the sensor does NOT fix the problem, please call Eriez for assistance.
  - b. If the sensor is greater than 0.5V, record the value and call Eriez for assistance.

## Missing Metal

**Problem: Paddles are actuating, but missing metal**

1. Go to the “**Machine Setup**” screen. Use the ‘Travel Time’ control to make adjustments. Please see ‘**Travel time**’ under the “**Machine Setup**” screen description for more details.
  - a. If the paddle is actuating before the metal reaches it, increase the travel time.
  - b. If the paddle is actuating after the metal passes it, decrease the travel time.

## Trajectory

**Problem: The Trajectory of metal being kicked is not optimal.**

1. Two adjustments are available to improve the kick of the metals over the splitter. First, reference the “Paddles actuating, but missing metal” section of this (\*\*missing words in PDF\*\*) the position can resolve this issue. Parameters can (\*\*missing words in PDF\*\*)

## Error – “Failed Getting Data”

**Problem: “Failed Getting Data” Errors**

1. A dialog box may pop up that indicates a Retry/Cancel option (See figure below). (Please note that the message will vary from this example). The ‘Retry/Cancel’ error will most likely occur when the E-Stop button has been pressed. Check the E-Stop.
  - a. If the E-Stop is pressed, wait until it can be reset. Once the E-Stop button is reset, press the ‘Retry’ button to resume normal operation. If the problem is not caused by the E-Stop, please call Eriez for assistance.



## Paddle Test:

Used to run a diagnostic test on each of the enabled paddles in the system. The diagnostics test checks whether a paddle is disabled, has a bad connection, is stuck in one position, or is operating normally. A visual inspection of the paddle operation should also be done to find problems that the diagnostic test cannot determine. Please note that the paddles are numbered from left to right when standing in front of the paddle rack. The following provide details about the messages displayed by this test:

### **Paddle X is disabled**

This message is displayed whenever a channel is disabled in the “**Channel Setup**” screen. A channel can be manually disabled, or the software can automatically disable it if an over current condition occurred in the paddle. If the channel was disabled accidentally, re-enable the channel in the “**Channel Setup**” screen and try pressing the ‘**Paddle Test**’ button again. If the problem continues to occur, please call Eriez for assistance.

### **Paddle X had a bad connection**

This message will be displayed if there is a bad connection in the Paddle, the writing to the paddle, or the electronics that drive the paddle.



Disconnecting it from the system can check the Paddle, then measuring it with an Ohmmeter. If the resistance between the two paddles wires is greater than 5 Ohms, then there is a problem with the paddle. If the resistance is less than 5 Ohms, then please call Eriez for assistance.

### **Paddle X is stuck**

This message indicated that the paddle is most likely not moving through the normal range of motion.

1. Go to the “Channel Setup” screen.
2. Unselect the channel corresponding to the desired paddle.
3. Move the paddle up and down through its full range of motion to see if the obstruction in movement can be found.
  - a. If the obstruction is found, remove it and re-enable the channel.
  - b. If an obstruction cannot be found or cannot be removed, then please call Eriez for assistance.

### **All paddle test results are normal.**

This message is displayed if all of the paddles pass the test.

## **Feeder:**

### **Problem: Brute Force Feeder not operating or displays erratic behavior**

Check for cracks in the vibratory tray, and loose motor bolt connections.

Remove top cover of the eccentric motors and swing weights back and forth. If weights do not move, or do not move freely, then the motor bearings may be damaged. Refer to the Eccentric Motor Maintenance section of this manual, and contact Eriez.

If weights swing freely, check fuses and connections in the control and at the motor junction box. If damaged, repair.

If connections are good, check that all three of the phase voltages are present at the outgoing terminal strip in the control panel for the motors. If a voltage phase is low or missing, then trace the problem

back to the power source, and check the motor starter, thermal overload protection, and fuses.

If all three phases are of equal voltage, then disconnect all of the motor lead wires from the terminal strip, and check the resistance from leg-to-leg and leg-to-ground. Leg-to-leg readings should be of equal resistance, and leg to ground should be equal and approach infinity.

If the readings are not consistent, then check the power cord lead wires for fatigue damage (continuity test), and replace if necessary.

If the problem is not resolved at this point, reference the eccentric motor maintenance manual for additional motor troubleshooting diagnostics or contact Eriez.

## **Paddle Replacement:**

### **Removal:**

Caution, turn power off before attempting to remove or replace paddles.

For a paddle that is not operating or not operating properly during the general maintenance and diagnostics tests:

Roll the paddle rack out from in front of the machine for diagnostics tests. To roll the rack away from the belt, remove the roll pins at all four top corners adjacent to the rack wheels. Use the handle to pull the rack out. Make sure before the rack is pulled out that the front cover does not hit the conveyor frame. If obstructions are present, the rack can be adjusted away from the belt pulley before rolling the rack away from the belt.

NOTE: The bolted plate in the middle of the rack just below the hood is to ensure the rack does not roll off the casters and fall to the ground. Ensure plate is present, securely fastened, and not damaged.

Remove the paddle cable connector from the manifold and use a multimeter to check the paddle coil resistance across the two cable pin terminals. The coil resistance should be roughly 3 to 4 Ohms. Next, check each coil lead wire pin to ground, and the resistance reading should be above 100K

Ohms. If the pin-to-pin reading is less than 2 ohms or above 5 ohms, then either the coil turns or coil lead wires may be damaged, and the paddle assembly must be removed for repair.

**NOTE:** Do not move the paddle while taking the coil resistance measurement since the eddy currents produced in the coil by moving the coil through a magnetic field will produce erroneous resistance readings, and also produce a current that may damage the meter.

### **Paddle Assembly Removal:**

To remove a paddle assembly from the rack, disconnect the two rubber clamps and lift the guard off the rack.

Remove the paddle assembly cable connector from the cable manifold.

While supporting the paddle, remove the two paddle assembly attachment bolts to the rack.

**NOTE:** Make certain the paddle assembly cables are not damaged as the paddle assembly is removed from the rack. Also, do not leave the paddle assembly standing up right after removal from the rack. The paddle assembly can easily tip over, and cause cable damage where the cable exits the coil shaft. Lay the paddle assembly down on the non-cable side and protect the cable where it exits the coil shaft.

### **Paddle assembly installation:**

Install the paddle assembly by following the reverse of the removal instructions. Position the paddles assembly along the groove machined into the rack, and slide the paddle assembly into rack. If installed correctly, the paddle assembly cable should not contact the adjacent paddle assembly in the rack.

Bolt the paddle assembly to the rack.

Connect the paddle assembly cable connector to the wiring manifold.

Ensure no the cable is not pinched between two pieces of metal.

Install all of the covers in the reverse order that they were removed.

## **Sensor Replacement:**

### **Removal:**

**Caution:** Turn power off before removal and replacement of sensors. Remove the cable guard in front of the control panel.

Remove the two clamp blocks that hold the sensor plates in the rack.

Use the finger hole in the plate, and slide the sensor rack out of the side of the machine. Slide each plate out until the plate with the damaged sensor is removed from the machine.

Disconnect the cable attached to the sensor. Remove the jam nut holding the sensor on the steel plate. If replacing multiple sensors, replace them individually to reduce error in reconnecting the cables.

**NOTE:** Do not pinch any sensor cables or the home run cable during the removal process. Also, keep fingers clear of pinch points between the frame and sensor rack that can cause injury.

### **Installation:**

Install the sensor panels in the reverse order of the removal procedure. Make sure that each sensor panel is installed in the reverse order that they were removed. The plastic contact surface of the sensor should be 1/16" recessed below the top of the surrounding aluminum pipe.

After all the sensor panels are replaced, conduct another sensor circuit check, and watch the fingers to make sure that the proper paddles are actuated at the end of the belt.

## **Belt Replacement:**

A urethane belt with corrugated sidewalls is installed on the conveyor. This is a seamless belt that is bonded together while installed on the machine. The replacement belt must not have any metal embedded in the belt.

Contact Eriez or the belting manufacturer if replacement is necessary.



# Passwords

## Password Setup:

There are two password *levels* available to the customer on the system; the *OPERATOR* and *MAINTENANCE*. The *OPERATOR* password *level* is the default level and only allows minimal control of the system. **(Please note that when at the operator password level, some controls will be disabled or not visible).** The *MAINTENANCE* password level allows more control of the system and should only be given to qualified personnel. The default *MAINTENANCE* password when shipped from the factory is “3333”. See [Password Setup](#) in the System Setup screen description for details on how to change passwords. The current password *level* can be seen at the bottom right portion on any of the screens. Please see the [“Control Panel”](#) screen description for details on how to change the maintenance password *level*.

## Screen Descriptions

### Screen Description Table of Contents:

- Numeric Keypad
- Numeric Keypad
- Control Panel
- Main
- Histogram
- Sensor Diagnostics
- Display Modes
- Paddle Diagnostics
- Paddle Diagnostics
- Machine Setup
- Detect Setup
- System Setup
- System Start Sequence
- Channel Setup
- Faults

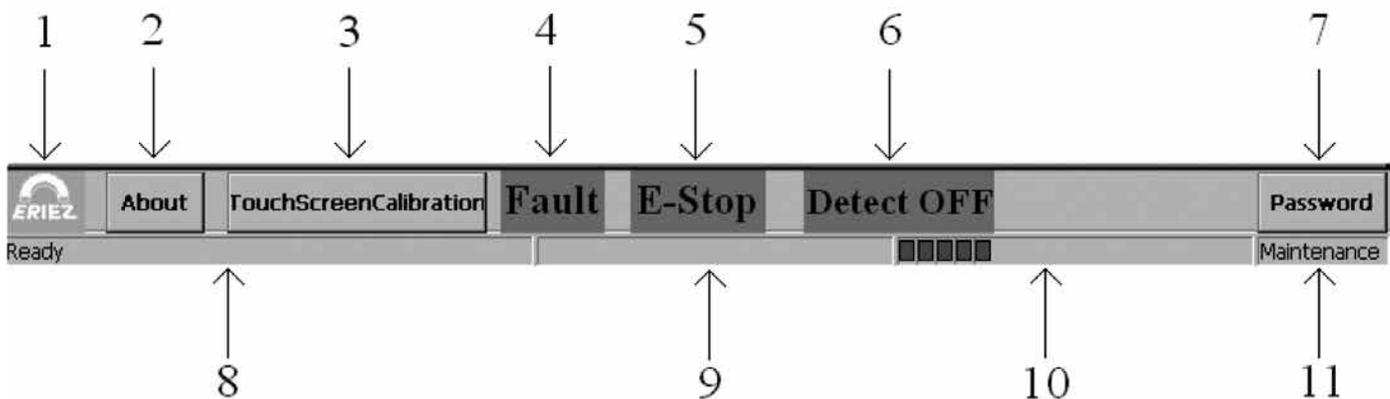
## Numeric Keypad:



The “Numeric Keypad” is used whenever a numerical value needs to be entered. The name of the parameter that is being changed is shown in the title portion of the keypad. In this example, the ‘Password’ is being entered.

<b>High Limit</b>	This is the maximum number that can be used for the 'Entered Value'
<b>Entered Value</b>	This is the value currently being entered.
<b>Low Limit</b>	This is the minimum number that can be used for the 'Entered Value'
<b>0-9</b>	These buttons are used to input digits into the 'Entered Value' field
<b>BKSPC</b>	This will delete the last digit in the 'Entered Value' field
<b>Original Value</b>	This is the value that is currently being used in the system
<b>OK</b>	This will cause the 'Entered Value' to be checked against the 'High Limits'
<b>Cancel</b>	This button will close the numeric keypad and keep the original value as the currently used value in the system

## Control Panel:



The "Control Panel" is shown at the bottom of every screen. The details for each numbered item is as follows:

### 1. Eriez Logo

Only for display purposes.

### 2. About

This button will pop up a dialog box to show software versions and Eriez contact information

### 3. Touch Screen Calibration

This button will launch a calibration program for the touch screen. This should only be used if the cursor is not following the position pressed on the screen.

### 4. Fault

This item is typically not displayed. It will be shown if a fault occurs. If a fault does occur, details about the fault can be found in the 'Type of Faults reported' topic of the "Faults" screen description.

### 5. E-Stop

This item will be displayed. It will be shown if a fault occurs. If a fault does occur, details about the fault can be found in the 'Type of Faults reported' topic of the "Faults" screen descriptions.

### 6. Detect OFF

This will be displayed whenever the signals from the sensors are not being used to detect metal. This will occur for example when in the "Paddle Diagnostics" screen.

### 7. Password

This button can be used to change the current password level

### 8. Main Status window

This window is used to display messages. For example, it will indicate that information is being sent to the driver modules or the system is ready.

### 9. Reply Status window

This window is used to display reply time messages from the driver modules. Most of the time, this window will be empty.

### 10. Progress Bar

This window is used to display a progress bar whenever extensive processing is being done. Please note that the rest of the display will typically be disabled when the progress bar is being used.

### 11. Current password level

This window shows the current password level.

## Main

The "Main" screen allows the operator to view the current state of the system, start/stop the system, and select the type of metal that is being sorted.

## System Start

The system start button will turn on the 'Startup Warning' for the time specified in the 'On time' field



of the “System Setup” screen. The startup warning is typically a horn or light (customer dependent). Once the startup warning completes, the equipment will be started in the order defined in the ‘[System Start Sequence](#)’ of the “System Setup” screen. Please see the “[System Setup](#)” screen for more details.

## System Stop

The equipment will be stopped in the order defined in the ‘[System Stop Sequence](#)’ of the “System Setup” screen. Please see the “[System Setup](#)” screen for more details.

## In-Feed Conveyor

The In-Feed Conveyor control shows the status of the In-Feed Conveyor (Running or Stopped). This control also allows a maintenance person to start or stop the In-Feed Conveyor without going through the ‘System Start’ or ‘System Stop’ sequence. Please note that not all systems will have an In-Feed Conveyor controls. If the control is not used, then it will not be displayed on this screen.

## ProSort Feeder

The ProSort Feeder control shows the status of the ProSort Feeder (Running or Stopped). This control also allows a maintenance person to start or stop the ProSort Feeder without going through the ‘System Start’ or ‘System Stop’ sequence. Please note that not all systems may use the ProSort Feeder control. If the control is not used, then it will not be displayed on this screen.

## ProSort Conveyor

The ProSort Conveyor control shows the status of the ProSort Conveyor (Running or Stopped). This control also allows a maintenance person to start or stop the ProSort Conveyor without going through the ‘System Start’ or ‘System Stop’ sequence. Please note that the speed of the conveyor can be changed on the “Machine Setup” screen.

## Take Away Conveyor

The Take Away Conveyor control shows the status of the Take Away Conveyor (Running or Stopped). This control also allows a maintenance person to start or stop the Take Away Conveyor without going through the ‘System Start’ or ‘System Stop’ sequence. Please note that not all systems may use the Take Away Conveyor control. If the control is not used, then it will not be displayed on this screen.

## 2<sup>nd</sup> Pass Conveyor

The 2<sup>nd</sup> Pass Conveyor control shows the status of the 2<sup>nd</sup> Pass Conveyor (Running or Stopped). This control also allows a maintenance person to start or stop the 2<sup>nd</sup> Pass Conveyor without going through the ‘System Start’ or ‘System Stop’ sequence. Please note that not all systems may use the control. If the control is not used, then it will not be displayed on this screen.

## Metal Type

The Metal Type control shows the type of metal that the unit is currently trying to detect. It also allows a new metal type to be selected. If a new metal type is desired, the ‘Change’ button can be pressed to pop up the Detect Setup dialog box. The Detect Setup dialog box shows a list of the metal type sorting that can be done on the current machine. When the Detect Setup dialog box pops up, simply highlight the desired metal by touching it on the screen. Once the metal type is highlighted, press the ‘OK’ button to accept the choice or the ‘Cancel’ button to abort the selection. Please see the ‘Detect Setup’ topic in the “Machine Setup” screen for more details on setting up threshold values for the metal types.

## Histogram

The “Histogram” shows one of three different count values (Count 1, Count 2, or Life Count) for each paddle in the system. Every time a paddle is actuated, each of the corresponding count values is incremented. The histogram can be used for such

things as looking at the spread of the material over the conveyor belt or monitoring the total life count of each paddle.

## Count Selection

There are three radio buttons (Count 1, Count 2, and Life Count) that select the count represented in the histogram.

## Count 1 and Count 2

These values can be reset by a maintenance person and were intended to help view the spread of material over the conveyor. Two values are provided with the intention that one may be used for short term monitoring and the other for longer term monitoring.

## Life Count

The Life Count value shows the total number of actuations of each paddle since the system was built. A factory technician can only reset this number.

## Reset Count

The Reset Count button allows the 'Count 1' or 'Count 2' values to be reset back to zero.

## Real-time data collection (Start and Stop)

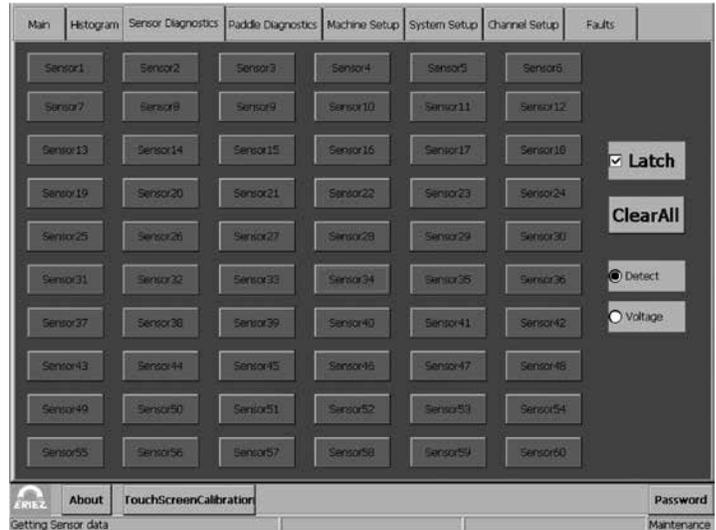
The default operation of the histogram is to display a snapshot of the count values each time that the histogram screen is made active or a new count selection is made. If continuous monitoring is desired, the 'Start' button can be pressed. The histogram will be continuously updated until the 'Stop' button is pressed. Please note that if the 'Start' button is pressed, no other screens can be displayed until the 'Stop' button is pressed.

## Zoom In/Out

The zoom in/out buttons change the scale of the histogram, which effectively allows the user to zoom in or out on the displayed data.

## Sensor Diagnostics

The "Sensor Diagnostics" screen can be used for troubleshooting, aiding the threshold setup, and verifying the operation of the sensors. Please note that the number of sensors shown will vary depending on size of the system.



## Display Modes

The 'Voltage' and 'Detect'

There are two basic display modes available on the Sensor Diagnostic screen:

### Voltage display mode

Shows the voltage measured on each of the sensors in the system, OR indicates that the sensor is disabled.



If the Latch option is selected, then the lowest voltage measured by the sensor will be displayed until the 'Clear All' button is pressed. This is useful when trying to determine a threshold value for a sample.

If the Latch option is NOT selected, then a continuous update of the measured voltage on each sensor will be displayed. This is useful for troubleshooting.

### Detect display mode

Shows whether a sensor is NOT detecting,



detecting, or disabled. The detection is based on the threshold in the 'Detect Setup' control of the "Machine Setup" for the type of metal selected on the "Main screen".



If the Latch option is selected, then each control will capture a detection until the 'ClearAll' button is pressed. This can be used to that a single operator can check the operation of the sensors. The operator can run metal over the sensors, and then look at the screen to make sure that each sensor detected the metal.

If the Latch option is NOT selected, then a continuous update of each sensor will be displayed.

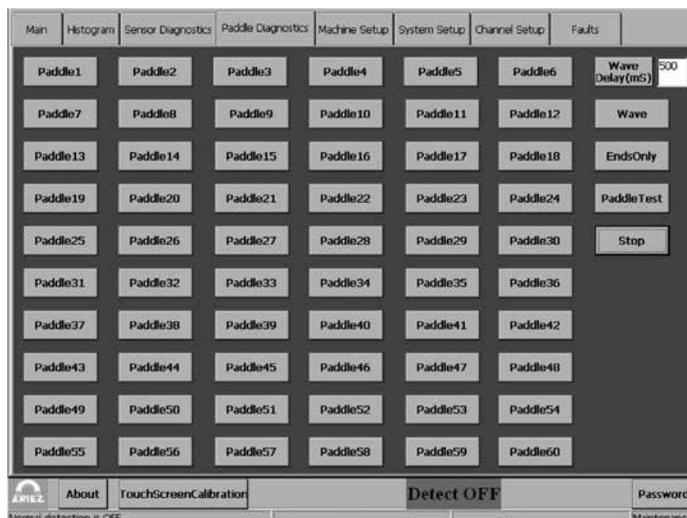
## Latch

If the latch check box is selected, then the latch option is enabled. Please see description of **Voltage display mode** and **Detect display mode** for details of operation.

## ClearAll

This button clears the latched values. Please note that this button is only visible when the 'Latch' check box is selected.

## Paddle Diagnostics



The "Paddle Diagnostic" screen is used to manually actuate the paddles (ignoring sensors) and to run diagnostic test. Please note that the number of paddles shown will vary depending on size of the system.

## ! WARNING

**THE NORMAL DETECTION OF METAL IS TURNED OFF WHILE ON THIS SCREEN. IF A PIECE OF METAL PASSES OVER THE SENSOR, IT WILL NOT ACTUATE THE PADDLE.**

## PaddleX

Pressing one of the 'PaddleX' buttons will actuate the corresponding paddle.

## Wave Delay

Number of milliseconds delay before actuating the next paddle during the 'Wave' operation.

## Wave

Used to actuate each paddle starting at the first enabled paddle and continuing to the last enabled paddle. When the last paddle is actuated, the sequence repeats starting at the first paddle. The 'Wave Delay' determines the time between actuation of each successive paddle. The wave can be used to visually inspect the operation of the paddles.

## Ends Only

Used to continuously actuate the first and last enabled paddle in the system.

## Paddle Test

The paddle test conducts a diagnostic test on each of the enabled paddles in the system. The diagnostics test checks whether a paddle is disabled, has a bad connection, is stuck in one position, or is operating normally. A visual inspection of the paddle operation should also be

done to find problems that the diagnostic test cannot determine. Note that the paddles are numbered from left to right when standing in front of the paddle rack. The following provide details about the messages displayed by this test:

### Paddle X is disabled

This message is displayed whenever a channel is disabled in the “Channel Setup” screen. A channel can be manually disabled, or the software can automatically disable it if an over current condition occurred in the paddle. If the channel was disabled accidentally, re-enable the channel in the “Channel Setup” screen and try pressing the ‘PaddleTest’ button again. If the problem continues to occur, please call Eriez for assistance.

### Paddle X had a bad connection

This message will be displayed if there is a bad connection in the Paddle, the wiring to the paddle, or the electronics that drive the paddle. Refer to the trouble-shooting guide for further paddle diagnostics.

### Paddle X is stuck

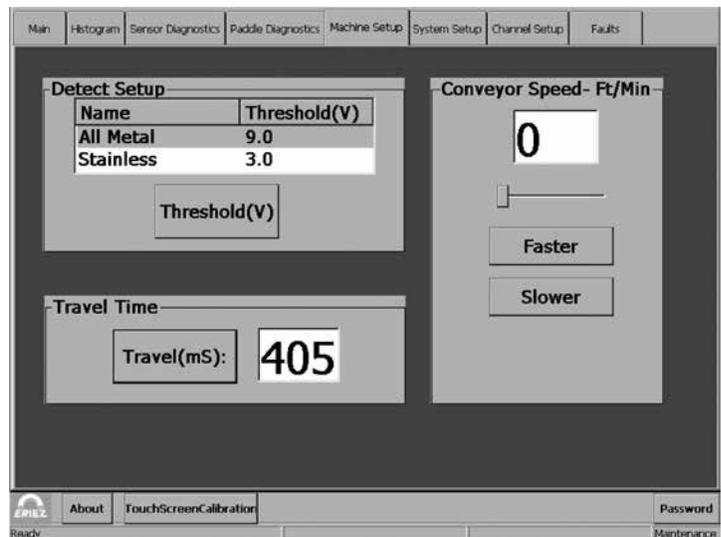
This message indicates that the paddle is most likely not moving through the normal range of motion.

1. Go to the “Channel Setup” screen.
2. Unselect the channel corresponding to the desired paddle.
3. Move the paddle up and down through its full range of motion to see if the obstruction in movement can be found.
  - a. If the obstruction is found, remove it and re-enable the channel.
  - a. If an obstruction cannot be found or cannot be removed, then please call Eriez for assistance.

### All paddle test results are normal.

This message is displayed if all of the paddles pass the test.

## Machine Setup



The “Machine Setup” screen allows the threshold value for the metals, the conveyor speed, and the ‘Travel Time’ to be displayed and modified.

## Detect Setup

The Detect Setup control allows a maintenance person to set up the sensor threshold values for the available metal types. The desired metal type to detect can then be selected on the “Main” screen via the ‘Metal Type’ control(s).

## Changing a threshold

1. Highlight the name of the desired metal type by touching it on the screen.
2. Press the ‘Threshold’ button.
3. Enter the desired value using the “numeric keypad”.

## Determining a detect threshold

The sensors will typically have a steady state value of about 10V-10.5V without any metal in close proximity. The voltage will drop below the steady state value when metal is passed over the sensor. The amount of voltage drop is based on the following 3 items:

1. Distance of the metal from the sensor. The

closer the metal is to the sensor, the larger the voltage drop.

2. Type of the metal. Ferrous and 316 Stainless Steel produce a larger drop in voltage than other non-ferrous metals.
3. Size of the metal. The larger the metal, the larger the voltage drop.

Taking the above criteria into account, the system can be set up to:

### Sort ALL metal from fluff

The threshold voltage used for this operation is typically around 9V. Setting the threshold voltage greater than 9V may make the sensors too sensitive, causing false tripping. A value much less than 9V will lessen the possibility of detecting smaller pieces of metal.

### Sort similar size 316 Stainless from other non-ferrous material and fluff

A decision must be made whether grade or recovery is more important. If grade is more important, then a lower threshold should be used. If recovery is more important, then a higher threshold should be used.

One method to determine the threshold to use when sorting metals is to run samples on the system while the 'Latch' option is used in conjunction with the 'Voltage' mode on the "Sensor Diagnostics" screen.

1. Go to the "Sensor Diagnostics" screen.
  2. Press the 'Latch' check box if it is unselected.
  3. Press the 'Voltage' radio button.
  4. Press the 'ClearAll' button.
  5. Place the desired sample on the belt.
  6. Record the lowest voltage values measured after passing over the sensors.
  7. Repeat steps 4 to 6 several times to determine a range of vales for the given sample.
  8. Start at step 4 with the next desired sample.
- If there is no or little overlap between the

ranges recorded in step 6 for the different samples, then sorting can be performed. The threshold should be set up for the sample with the lowest range. Setting the machine up under these conditions will cause the sample in the lowest range to be rejected and the other samples to pass.

## Conveyor Speed

The conveyor speed control uses feedback from the VFC (Variable Frequency Control) to calculate and display a speed. The conveyor speed control also allows a maintenance person to change the belt speed using the 'Faster' and 'Slower' buttons. Please note that if a VFC is not used, or the VFC used in the system does not support this functionality, this control will not be shown.

## Travel Time

The travel time is the time from when the sensor detects the metal until the paddle is actuated. The sensors lie under the belt ahead of the paddles. Since the timing of the paddle is critical in order to get the optimum "kick", the travel time may need to be adjusted if the conveyor speed is changed or the trajectory of the metal needs to be changed.

## System Setup

The screenshot shows the 'System Setup' screen with the following sections:

- System Start Sequence:** A table with columns 'Name' and 'Delay(S)'.

Name	Delay(S)
ProSort Conveyor	1
Take Away Conveyor	1
In-Feed Conveyor	1
ProSort Feeder	1
2nd Pass Conveyor	1
- System Stop Sequence:** A table with columns 'Name' and 'Delay(S)'.

Name	Delay(S)
ProSort Feeder	1
In-Feed Conveyor	1
ProSort Conveyor	1
Take Away Conveyor	1
2nd Pass Conveyor	1
- Startup Warning:** Ontime(S): 30
- Password Setup:** Change Password, Timeout(S): 500

At the bottom, there are buttons for 'About', 'TouchScreenCalibration', and 'Password Maintenance'.

The “System Setup” screen can be used by a maintenance person to configure the equipment start sequence, equipment stop sequence, startup warning, “on-time”, and password value for the system.

## System Start Sequence

The system start sequence is used by a maintenance person to configure the order that the equipment in the system is turned on when the ‘System Start’ button is pressed on the “Main” screen. This control also allows a maintenance person to determine the delay before turning on each piece of equipment in the sequence.

The order that the equipment is turned on is determined by the position in the list; where the first item to be turned on is at the top of the list and the last item to be turned on is at the bottom of the list.

Steps to set up the start sequence:

- Highlight the name of the desired piece of equipment by touching it on the screen.
- Use the ‘Up’ and ‘Down’ buttons to move the selected item in the list.

Select the amount of time to wait before turning on the selected piece of equipment by using the ‘Delay’ button. The delay is the amount of time prior to turning on the selected piece of equipment. Please note that if the piece of equipment should not be turned on during the start sequence, use the value of **-1** for the delay. The value of **-1** will flag the software to skip the equipment during the start sequence.

## System Stop Sequence

The system stop sequence is used by a maintenance person to configure the order that the equipment in the system is turned off when the ‘System Stop’ button is pressed on

the “Main” screen. This control also allows a maintenance person to determine the delay before turning off each piece of equipment in the sequence.

The order that the equipment is turned off is determined by the position in the list; where the first item to be turned off is at the top of the list and the last item to be turned off is at the bottom of the list.

Steps to set up the stop sequence:

- Highlight the name of the desired piece of equipment by touching it on the screen.
- Use the ‘Up’ and ‘Down’ buttons to move the selected item in the list.

Select the amount of time to wait before turning off the selected piece of equipment by using the ‘Delay’ button. The delay is the amount of time prior to turning off the selected piece of equipment. Please note that if the piece of equipment should not be turned off during the stop sequence, use the value of **-1** (minus 1) for the delay. The value of **-1** (minus 1) will flag the software to skip the equipment during the stop sequence.

## Startup Warning

The startup-warning relay is energized prior to executing the start sequence when the ‘System Start’ button is pressed on the “Main” screen. The startup-warning relay is typically connected to a horn or light beacon in the system. The amount of time that the startup relay is energized is shown in the ‘Startup Warning’ control.

## “Ontime”

This button allows a maintenance person to change the amount of time that the startup-warning relay is energized prior to executing the ‘System Start Sequence’.



## CAUTION

The only time the startup warning relay will come on is when the 'System Start' button is pressed on the "main" screen. It will not come on if equipment is turned on individually.

## Password Setup

This control allows a maintenance person to change the password and password timeout.

## Change Password

This button is used to allow a maintenance person to change passwords. When this button is pressed the "numeric keypad" will allow a new password to be entered. If the 'OK' button is pressed on the "numeric keypad", then a prompt to confirm the password will be displayed. If 'Yes' is selected, then the new password will become active. If 'No' is selected, then the "numeric keypad" will be displayed again to re-enter the desired value.

## Timeout

This button is used to allow a maintenance person to set the password timeout duration. The password timeout is used to automatically revert back to the operator password *level* after the duration has expired. This feature was added so that the maintenance password *level* would not remain active indefinitely if the maintenance person does not purposely change back to the operator *level*. Please note that every time that the touch screen is pressed, the timeout period is reset. Also please note that if you would like to revert back to the operator password *level* prior to the timeout, simply press the 'Password' button on the "Control Panel" and enter an invalid maintenance password.

## Channel Setup



The "Channel Setup" screen can be used to enable/disable a single channel in the system for troubleshooting or if a failure occurs. A channel is made up of a sensor, electronics, and a paddle. Disabling the channel will notify the software to stop monitoring the sensor and to remove power from the corresponding paddle.

Note: The snapshot of the "Channel Setup" screen above shows that all of the channels in the system are enabled except for channel 2.

## Faults



The “Faults” Screen will show details about any faults that are occurring in the system. This screen is the first place to check if the system is not functioning properly.

## **Fault Clear**

Clears all of the faults. Some faults will automatically clear once they have been corrected. However, some faults require this button to be pressed in order to clear them.

## **Type of Faults reported**

### **Conveyor Fault**

The conveyor fault input is connected to the VFC (Variable Frequency Control). Please see the documentation for the VFC if this fault occurs.

### **Sensor X is not functioning properly**

This fault occurs if the sensor has been measuring a very low voltage for an extended period of time while the conveyor is running. Check to make sure that a non-moving piece of metal is not near the sensor. If no metal is over the sensor, the please contact Eriez for assistance.

### **Paddle X-over current condition, Paddle has been disabled.**

This fault occurs if a paddle draws too much current. If the fault occurs, the software automatically disables the paddle to prevent damage to the hardware. The most likely cause of this condition is a shorted paddle. Refer to the Troubleshooting Guide (section 4) for further instructions to identify a shorted paddle.

### **Communication Fault for Driver X**

This fault could occur if the E-stop button is pressed while the embedded

PC is trying to communicate to a driver module. Once the E-stop is pulled out to resume normal operation, press the ‘Fault Clear’ button. If the communication fault continues with the E-stop pulled out (in the operating position), then please contact Eriez for assistance.

## **Electrical Control Installation, Adjustment & Operating Instructions Eriez ProSort II Separator Controller**

### **Style No. 201006983**

#### **Description**

The Eriez ProSort II controllers are designed specifically to operate the Eriez ProSort separator. The control consists of a variable frequency drive for the conveyor motor and motor starters for the feeder motors, take away conveyor motor, and the in feed conveyor motor. The control consists of two air-conditioned cabinets mounted on the separator. The transformer housing contains a three-phase power transformer, the motor starters, control transformer, fuses and the main disconnect switch. The power supply housing contains the power supplies, driver modules interface board, embedded PC and operators touch screen.

#### **Installation**

##### **Mounting**

The controllers are Nema 4/12 rated and suitable for wet and dusty environments, and are pre-mounted on the separator.

##### **Wiring**

The wiring for operation of the separator has been pre-installed by Eriez. The wiring from the mains must follow the NEC or applicable local codes for proper installation. Note a separate circuit is required to power the cabinet heaters. The heaters allow the VFC and display screens to function if the cabinet temperature drops below 32()F. Special



attention should be given to a good building ground system for proper operation of the VFC control, and PC. Refer to drawing 4N-201007027.

### Connections

REFER TO DRAWING NO. 4N-201007027

1. Connect 460-vac 60hz supply to disconnect switch terminals L1, L2, and L3.
2. Connect a 120-vac source to terminals 31 and 32.
3. Terminals 15 and 16 are provided for connection to an optional second pass conveyor motor starter or running status of the ProSort II control. Only one of these options can be chosen at a time and has to be programmed into the interface board via the operator touch screen.

Terminals 17 and 18 are provided for fault status of the ProSort II control.

### Operation

The operation of the separator is controlled from the touch screen please see the section on the screen descriptions.

### Adjustments

The VFC drives used to control the conveyor are adjusted at the factory. However, if further adjustment is needed, refer to the VFC manual found in the control enclosure. The factory setting are listed on the schematic and outline drawing 4N-201007027.

### Troubleshooting

See Troubleshooting Guide section.

## Appendix 1 Paddle Repair

### **!** WARNING

At any time, when maintaining or handling the paddle assemblies, extreme care must be taken not to damage the lead wires. Do not lay the unit down on, or allow the unit to fall over on the lead wire side of the unit. Any damage to the lead wires in the shaft area can drastically reduce the life of the unit.

### **!** WARNING

Only qualified personnel should perform all repairs.

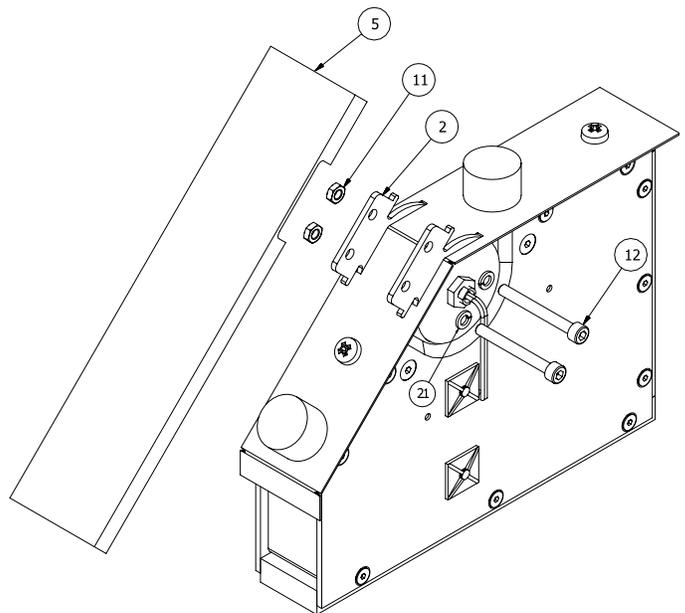
### **!** CAUTION

Strong magnets are installed inside the paddle assemblies. Attempting to remove the side plates from the assembly can result in severe injury to fingers. Properly secure all components and use wedges and pry bars to safely remove the covers. Do not attempt to remove magnets from the side plate without contacting the Eriez Service Department for instructions.

## Paddle Replacement

Refer to the **FIGURE 1**.

The paddles on the ProSort II are a wear item and will eventually need replaced. The following procedure should be followed for removing and replacing the paddles:



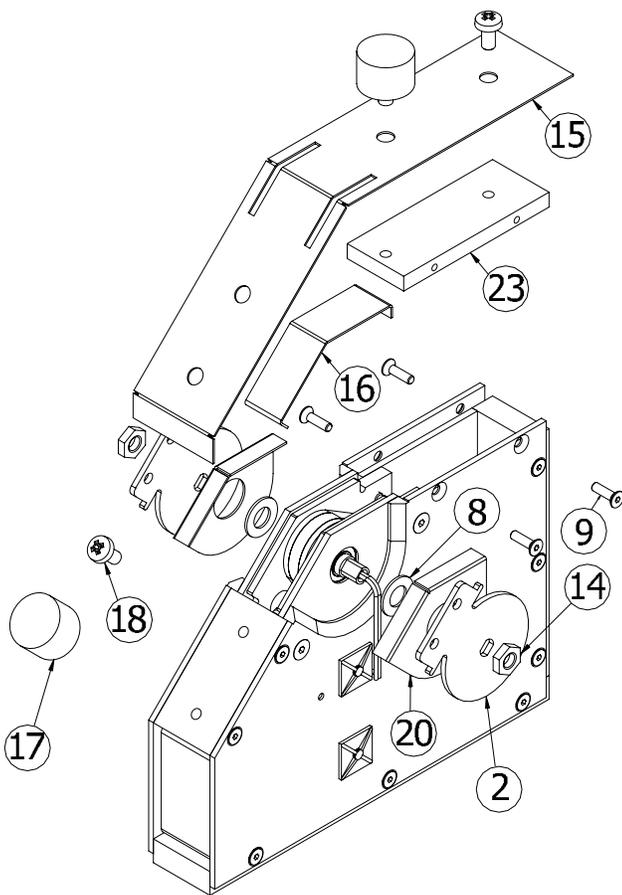
**FIGURE 1**

## Paddle removal procedure:

1. Remove the two nuts (item 11) from bolts (item 12) that secure the paddle to the main assembly.
2. Remove the bolts (item 12).
3. Remove the paddle (item 5) from the main assembly.

## Paddle installation procedure:

1. Place the paddle (item 5) between the finger plates (item 2).
2. Install a lock washer (item 21) on each bolt (item 12) and insert into the finger plate (item 2) and push all the way through the paddle (item 5) until it protrudes out the other finger plate (item 2).
3. Install the two nuts (item 11) on the two bolts and tighten.

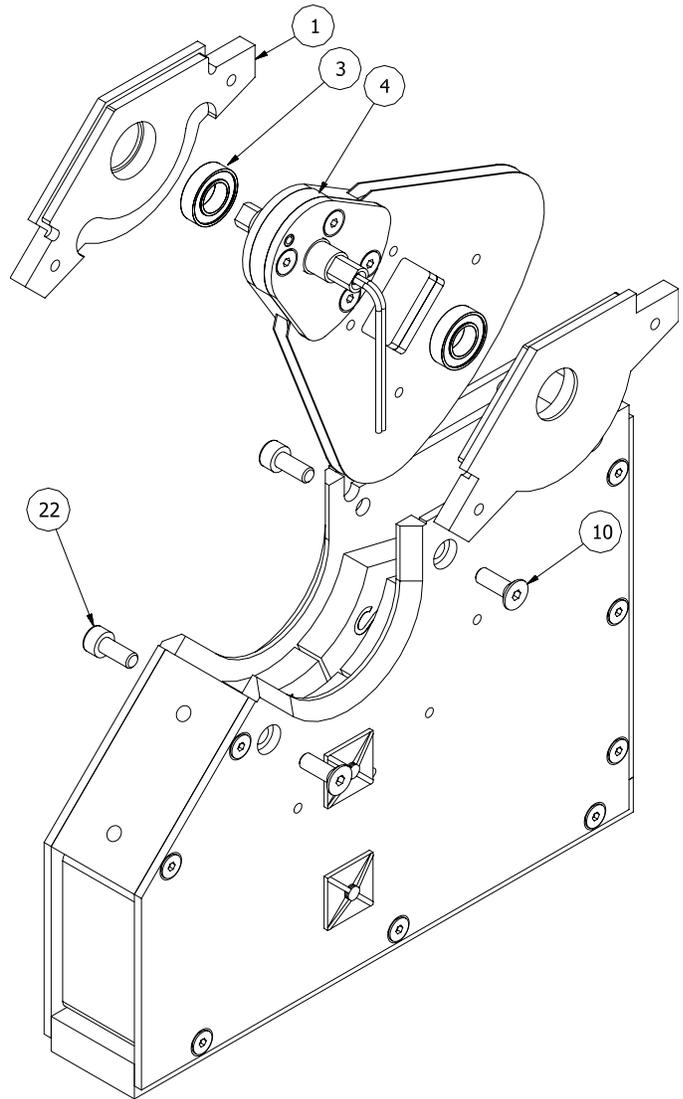


**FIGURE 2**

## Coil and Bearing Replacement

Refer to the **Figures 2, 3 and 4.**

The coil or the bearings may eventually fail under normal use in the metal sort paddle actuator. The following procedure should be used to replace the coil/ shaft assembly or the shaft bearings:



**FIGURE 3**

## Coil assembly and bearing removal:

1. Refer to the “paddle removal procedure” and **FIGURE 1** to remove the paddle from the main assembly.

2. Remove the two shock mounts (item 17) and screws (item 18) that secure the top finger shield (item 15).
3. Remove the top finger shield (item 15).
4. Remove the two jam nuts (item 14) that secure the finger plates (item 2).
5. Slide the two finger plates (item 2), felt seals (item 20) and washers (item 8) from the shaft.
6. Remove the four flat head socket cap screws that secure the top secondary shield (item 9).
7. Remove the top secondary shield. (item 23).
8. Remove the top cover (item 16).
9. Remove the four screws that attach the bearing plates to the main assembly (items 10 and 22).
10. Remove the coil/shaft assembly (item 4) and the two bearing plates (item 1) as a unit by sliding them towards the rear of the unit then pulling them up and out of the main body.
11. Slide the two bearing plates (item 1) off of the coil assembly (item 4) shaft. The bearings (item 3) are pressed into the bearing plates and will slide off of the shaft with the bearing plates.

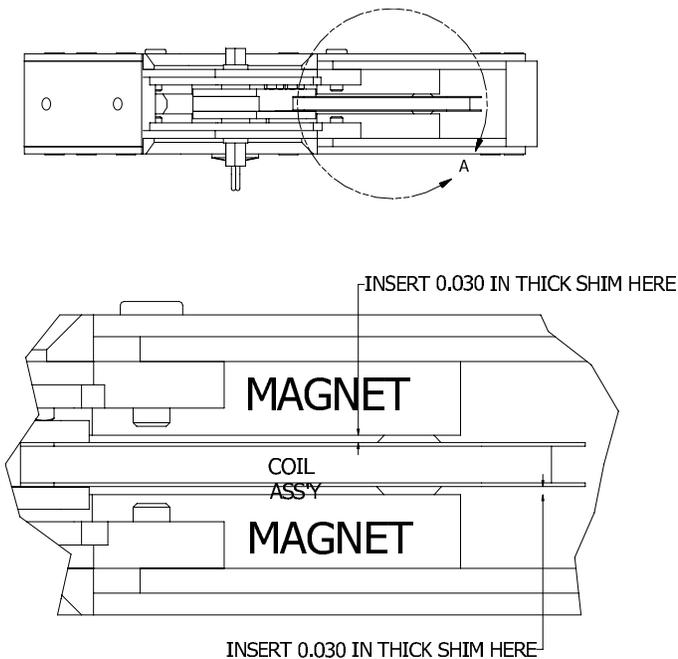
12. Remove the bearing (item 3) from the bearing plate (item 1) using a bearing drift and a hammer or press. **DO NOT POUND DIRECTLY ON THE BEARING!**

Remove any sealant from the bearing plates (item 1) and top cover (item 16), because more will need to be applied during assembly to seal the unit.

### Coil assembly and bearing assembly:

Refer to the **FIGURES 2, 3 AND 4**.

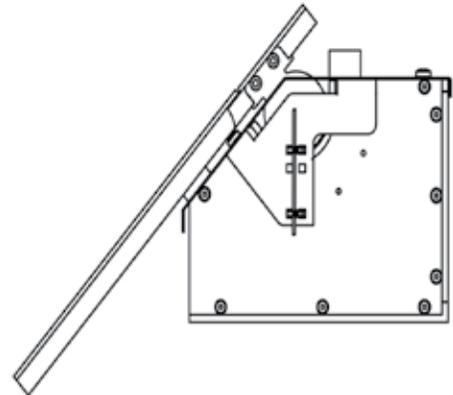
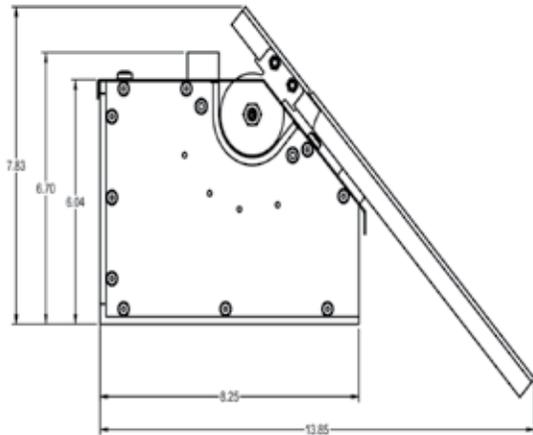
1. Press or drive bearings (item 3) into bearing plates (item 1). **DO NOT POUND DIRECTLY ON THE BEARING!** Insert the bearings all the way to the shoulder.
2. Slide the bearing plates (item 1) with the bearings (item 3) installed, onto the coil assembly shaft (item 4).
3. Insert the coil assembly (item 4) and bearing plates (item 1) as a unit into the main body, making sure the coil lead wires exit the shaft on the right side of the unit as shown in **FIGURE 3**. Line up the screw holes for the bearing plate screws (item 10 and 22).
4. Insert the two flat head socket cap screws (item 10) in the right side bearing plate (item 1) and tighten snug.
5. Insert the two socket cap screws (item 22) in the left side bearing plate (item 1) and hand tighten only.
6. Referring to **FIGURE 4** below, insert two 0.030 in shims between the coil assembly and the magnets to center the coil. Move the left side bearing plate as needed to center the coil between the magnets. Once centered, tighten the screws that attach the bearing plates (items 10 and 22). Remove the shims and swing the coil through its entire range of motion. The coil should be centered between the magnets, and **MUST NOT RUB**. A rubbing coil will decrease performance and lead to coil failure. If coil is not centered, or rubs, loosen the socket cap screws and repeat the alignment procedure until the coil is centered.



**FIGURE 4**

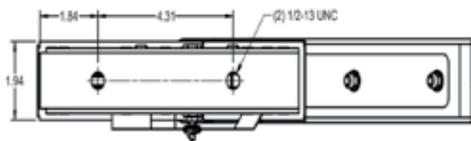
7. Insert the top secondary shield (item 23) making sure that the holes line up for the mounting screws (item 9) and the finger shield (item 15). Refer to **FIGURE 2** for hole orientation.
8. Snap in the top cover (item 16) between the bearing plates (item 1). Apply a bead of silicone sealant around the top cover, filling any gaps.
9. Apply a small amount of grease in the void between the bearing (item 3) and the washer (item 8). Avoid getting any grease on the shaft; this will inhibit the adhesion of the Loctite to the shaft.
10. Slide the two washers (item 8) onto each side of the shaft.
11. Slide the two felt seals (item 20) onto each side of the shaft. The felt seal (item 20) should be centered on the washer (item 8), and must not overlap. (NOTE: If you are installing new felt seals (item 20), they should be saturated with light oil and the excess squeezed out prior to installation).
12. Install the two finger plates (item 2) to each side of the shaft. Apply a generous amount of Loctite #242 to the threaded portion of the shaft. Install the jam nuts (item 14) and tighten. (NOTE: The shaft and the finger plates must be clean, dry and free of oil for the Loctite to adhere properly)
13. Fold down the tops of the 2 felt seals (item 20) and slide the finger shield (item 15) over the finger plates (item 2). Make sure the felt seals stay folded under the finger shield.
14. Apply Loctite #242 to the threaded portion of the two shock mounts (item 17). Install the two shock mounts (item 17) and screws (item 18) in the finger shield (item 15) but do not tighten.
15. Adjust the finger shield (item 15) so that it does not rub on the finger plates (item 2) and tighten the screws (item 18) and shock mounts (item 17).
16. Follow the paddle installation procedure to mount the paddle (item 5) to the actuator.

# Appendix 1 Paddle Repair Images



### PADDLE SPECIFICATIONS:

1. MOUNTING CENTERS: 2.125 IN
2. WEIGHT: 12 LB
3. PADDLE TRAVEL: 45°
4. OPERATING VOLTAGE:  
EXTEND: UP TO 17.5 VDC  
RETRACT: UP TO -6 VDC
5. OPERATING POWER:  
EXTEND: UP TO 100 WATT  
RETRACT: UP TO 12 WATTS



REVISIONS	DATE	DESCRIPTION

REV	DESCRIPTION	DATE	BY	CHECKED

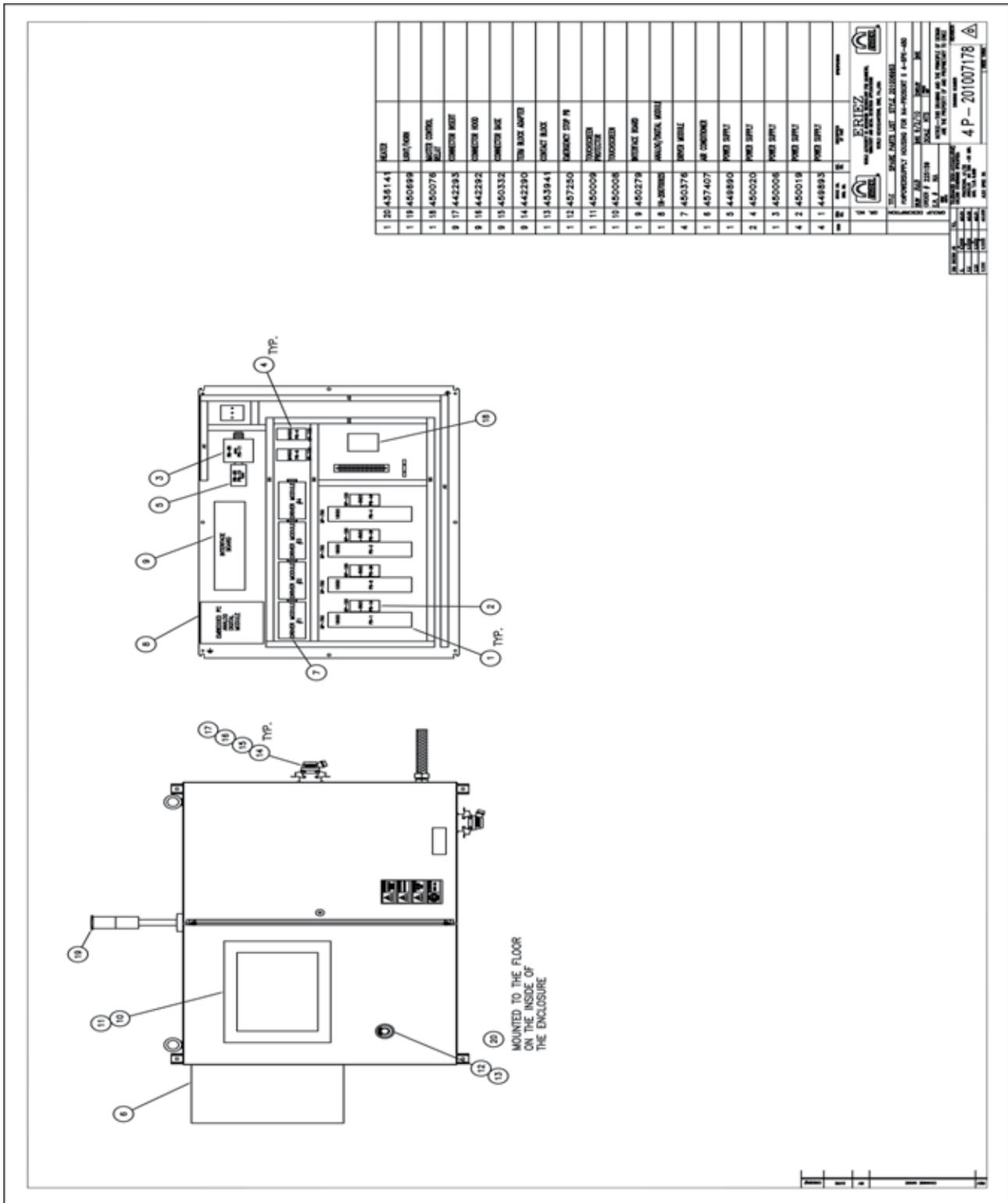
GROUP DESCRIPTION	REV. NO.	ISSUE DATE	REV. NO.	ISSUE DATE

		<b>ERIEZ</b> <small>WORLD AUTHORITY IN ADVANCED TECHNOLOGY FOR MAGNETIC          VIBRATION AND BELT FEED SYSTEM APPLICATIONS          WORLD HEADQUARTERS, ONE, PA, USA</small>			
SPEC SHEET					
FOR: PROBORT II PADDLE AND ACTUATOR					
DR BY	ASC	DATE	3/10/2011	CHKD BY	SKT
ORDER #	225158	SCALE	1/2	REV	
E.R.#		NOT CE - THIS DRAWING AND THE PRINCIPLE OF DESIGN ARE THE PROPERTY OF AND PROPRIETARY TO ERIEZ			
REV		DRAWING NO. <b>3N - 201102604</b>			
		<small>PROBORT II PADDLE AND ACTUATOR          PADDLE OPERATING SPECIFICATIONS</small>			
		<small>FRONT VIEW 1:10          ANGULAR VIEW 2:10          SIDE VIEW 1:10          ISOMETRIC VIEW 2:10</small>			







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