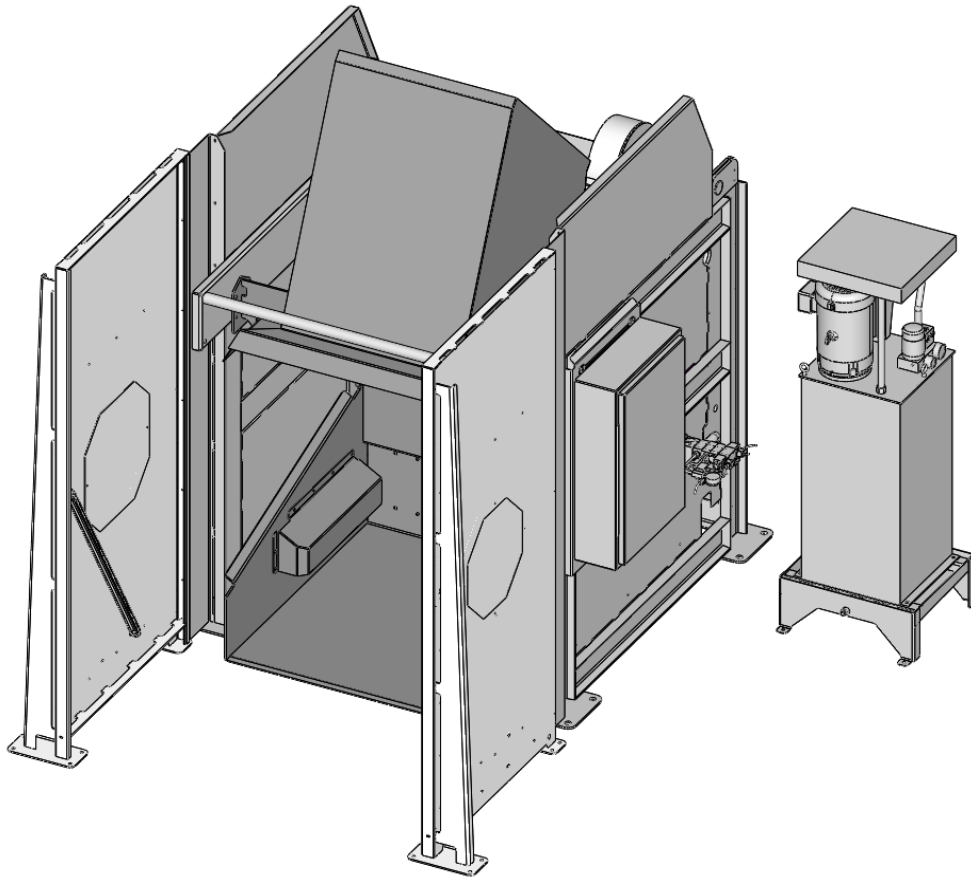


DISCHARGE

USER MANUAL

CONTAINER DISCHARGER



FORWARD THINKING | REAL RESULTS®

Creative Werks, LLC

CSO E342034005, E342034006

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1. Introduction

At NBE, we strive to provide our customers with tools to improve product quality, increase safety and hygiene in the manufacturing process, and reduce operating costs. This manual is an extension of our commitment to the success of our customers and the safe, optimal performance of our equipment.





1.1 Using This Manual

The purpose of this manual is to provide information that can be used to train personnel and generate in-house procedures for safely operating and maintaining this equipment. This manual is intended for users with a basic understanding of industrial, automated equipment.

The information within this manual is not intended to replace good judgment and personal responsibility.

1.1.1 Symbols

The following symbols are used in this manual to identify information on hazards and prevention, as well as protection of the equipment.

-  **DANGER:** Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
-  **WARNING:** Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
-  **CAUTION:** Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
-  **NOTICE:** Indicates a practice that is not related to personal injury.

1.1.2 Terms and Definitions

The list below contains common terms and abbreviations used in this manual, along with definitions.

TERM	DEFINITION
Supplier	NBE
User, Owner	Individual or corporation that utilizes and/or owns the equipment
Personnel, Operator	Individual employed on behalf of or by the user/owner
Hazard	Potential cause of harm
In-house	Conducted from within your organization
PPE	Personal Protective Equipment
ANSI	Approved American National Standard
OSHA	Occupational Safety & Health Administration

2. Description of Equipment

NBE equipment is engineered to improve productivity by controlling the flow of materials. We provide robust, high-quality equipment, using designs and principles that have been refined over time, to minimize required maintenance and maximize equipment lifespan. This section describes the specifications of your equipment.

2.1 Equipment Identification & Points of Contact

The table below contains identification of your equipment. Refer to this information for warranty claims and spare parts purchasing.

COMPANY	Creative Werks, LLC
CUSTOMER PO	2020000199, 2020000184
CSO NUMBER	E342034005, E342034006
NBE LINE ITEMS	J36258 Custom Container Dumper SP-DUMPER J36259 Custom Container Dumper SP-DUMPER
SALES PERSON	Jeff Swiatlo 616-399-2220 jeffs@nbe-inc.com
NBE DIRECTORY	616-399-2220 Please specify your area of interest, including: <ul style="list-style-type: none">• Spare parts• Service• Engineering• Manuals
MANUFACTURE DATE	May 2020

2.2 Equipment Details

2.2.1 Materials of Construction

Product Contact Material: 304 Stainless Steel; 7GA and thinner has 2B finish, thicker than 1/4" has mill finish including all tubing and pipe

Non-Product Contact Material: Carbon Steel, Painted

2.2.2 Electrical System and Controls



NOTICE: The customer is responsible for a portion of the electrical installation. Refer to the Installation section for details.

Environment: This equipment is designed for a non-classified, non-explosion proof, general industrial environment.

Recommended Feeder Capacity: 30 AMP

Supply Voltage: 460 VAC/3 PH/60 HZ

Control Voltage: 24 VDC

NEMA: 12

HMI: 3.5" Pro-Face TFT Color LCD

PLC: Allen-Bradley MicroLogix 1400

Refer to controls schematics for motor power and control power distribution, functional wiring schematics, panel layout, and components.

2.2.3 Container Discharger

Quantity: 3

Discharger Type: Lift-and-Seal

Capacity: 1500 lbs

Load Height: Floor level

Degrees Rotation: 135°

Rotation Actuator: (2) 4" bore x 24" stroke hydraulic cylinders

Discharge Height: 78.78"

Swing Height: 170"

Hydraulic System: Specifications include:

- Hydraulic Power Unit: 7.5 HP motor; 8.6 GPM @ 1770 RPM pump; 40 gallon fluid reservoir
- 24 VDC hydraulic valve stack. Refer to **hydraulic schematic 03759100** for details.

Bucket Assembly: Includes seal platform and hood of the following specifications:

- Hood: Discharge hood seals to the top of the container and guides material from the container
- Seal Platform: Lifts the container and seals it to the hood using (2) 2.5" bore x 12.0" stroke hydraulic cylinders. Travels along track roller bearings for guided motion

Guarding: Discharger guarding includes integral guards on 2 sides and (1) bolt-on guard on rear. Load area guarding includes a safety cage comprised of (2) guard panels (with foot pads for anchoring and polycarbonate viewing windows) and (2) Keyence GL-R60H 1225mm light curtains

2.3 Application

2.3.1 Container Description

This equipment handles a container of the following characteristics:

- Type: Tote
- Dimensions: 40" x 48" x 51.5" tall

2.3.2 Material Characteristics

This equipment is designed to process material of the following properties:

- Material Name: Cereal with Marshmallow Bits
- Bulk Density (PCF): 8



DANGER: Do not process flammable, explosive, toxic, or otherwise hazardous materials without first performing an appropriate Process Hazard Analysis (PHA).

NBE cannot be an expert in the chemical and biological properties of the infinite number of materials that could be handled by this equipment. This equipment is not designed to safely process hazardous materials unless additional precautions are taken.

Before processing any materials that are or can react to become flammable, explosive, toxic, or otherwise hazardous, the user/owner must perform a thorough risk assessment and Process Hazard Analysis of the entire process, including contingency plans for dealing with processing errors and upset conditions.

3. Safety



WARNING: Read and understand this manual before using this machine. Failure to follow operating instructions could result in death or serious injury.

Always observe the safety precautions below, as well as in-house guidelines and federal, state, and local codes/standards. Read and understand all operating information and drawings/schematics before using this equipment.

3.1 User/Owner Responsibility

Above all, it is the responsibility of the user/owner to provide a safe working environment, including:

- Compliance with all applicable health and safety codes/standards
- Training for all personnel
- Provision of appropriate PPE
- Proper maintenance and operation of systems/equipment

3.2 Safety Guidelines

Ensure that the motor and frame of the equipment are grounded in accordance with all federal, state, and local codes/standards.

Do not use a damaged electrical supply cable or a connection that is not approved by federal, state, and local codes/standards.

Your NBE equipment must have a lockable isolation/relief device for each energy source. If these device(s) are not purchased from NBE, the customer must provide and install a lockable isolation/relief device for each energy source (in accordance with federal, state, and local codes/standards).

All moving parts of this equipment must be fully covered by guarding. NBE offers a full safety cage as a protective measure. It is the responsibility of the user/owner to select and implement the appropriate protective equipment (in accordance with federal, state, and local codes/standards).

DO NOT operate this equipment with any of the access covers/guards or safety devices removed, defeated, or bypassed. Operate this equipment only when all access covers/guards and safety devices are in place and operational.

DO NOT operate this equipment until you have been fully trained.

Installation, service, and maintenance of this equipment must only be performed by experienced, qualified personnel.

DO NOT wear any items that could get caught in the moving parts of this equipment.

Never place any part of your body under or near rotating members or moving parts of machinery.

NEVER reach beyond a guard to resolve a jam or to access the equipment when the equipment is in operation or can potentially operate.

Before operating equipment, always confirm that the operating envelope is clear of personnel.

Isolate energy and perform your lockout/tag-out procedure before adjusting, servicing, repairing, maintaining, or clearing blockages from this equipment. Refer to the Energy Isolation section for additional information.

Perform scheduled inspections and maintenance of the equipment (refer to the Maintenance section for additional information). Repair/replace defective components immediately, and do not operate the equipment until it is in proper operating condition.

DO NOT wash down electric motors (unless wash-down rated).

The customer is responsible for evaluation of the noise level emitted by the equipment and provision of appropriate PPE, as required.

If any safety decal is damaged or not readable, shut down the equipment and do not resume operation until the decal is replaced. For current pricing and delivery, contact the NBE Parts Division at (616) 399-2220 or visit www.nbe-inc.com to reorder safety decals.

3.3 Energy Isolation



DANGER: Electrical enclosures contain hazardous voltage that will result in electrical shock or burn. Turn off and lock out equipment before servicing.



DANGER: Equipment within the electrical enclosure poses a shock and arc flash hazard that may cause severe injury or death. Wear proper protective equipment before opening or performing diagnostic measurements or testing while energized. Only qualified persons should open or work within the electrical enclosure.

Your NBE equipment must have a lockable isolation/relief device for each energy source. If these device(s) are not purchased from NBE, the customer must provide and install a lockable isolation/relief device for each energy source (in accordance with federal, state, and local codes/standards).

3.3.1 Energy Sources

This equipment incorporates separate energy sources. Proper shutdown and lockout/tag-out must only be performed by qualified personnel, and must include disabling of all energy sources including but not limited to the following:

- Electrical: Shut off and lock out all electrical disconnects. Verify electrical power is in the off state.
- Hydraulic: Verify proper electrical lockout/tag-out of the equipment. Verify that hydraulic power unit cannot be started, and that energy is relieved/restrained appropriately.

3.3.2 Energy Isolation Method

Before adjusting, servicing, repairing, maintaining, or clearing blockages from this equipment, complete the procedure below.

1. Review and become familiar with all documentation and schematics. Identify energy sources and stored energy.
2. Wear appropriate PPE.
3. Evaluate the requirements of your task, including the position of actuators/devices.
4. Move the actuators/devices into the appropriate position.
5. Using the appropriate device(s), pin or block components that may be affected by mechanical motion (such as motion due to gravity).
6. Shut off/disconnect the main air supply. Allow air to fully bleed from equipment.
7. Identify and release stored energy as necessary.
8. Shut off/disconnect the main electrical power source.
9. Perform your in-house lockout/tag-out procedure.
10. Verify that all energy sources are in the off/neutral state.

3.4 Emergency Stop Devices

3.4.1 Locations

This equipment has (1) E-Stop button on the main panel and (1) light curtain on the load interface area.

3.4.2 Functionality

E-Stop button turns off all 24 VDC MCR outputs, including all light curtain relay-powered outputs, simultaneously.

Light curtain turns off light curtain relay-powered outputs simultaneously. The hydraulic pump motor remains active during a light curtain stop to prevent repetitive re-starting of the motor.

3.4.3 Recovery

To recover from an E-Stop condition, pull out the E-Stop button, then press the MCR Reset/Power On pushbutton.

To recover from a light curtain interruption, clear the light curtain, then press the Light Curtain Reset pushbutton.

4. Installation



WARNING: Installation must only be performed by qualified professionals with the appropriate credentials and equipment/rigging for all required tasks.

4.1 Pre-Shipment Planning

Prior to shipment of the equipment:

1. Ensure that your facility has an adequate foundation to support the equipment. Consider the equipment weight, material weight, and torque when the equipment is operating.
2. Determine the appropriate anchoring method for the equipment.
3. Ensure that your facility entrances can accommodate the equipment.
4. Determine the equipment required to move the pieces of the system, including vehicles and rigging. Allow only qualified professionals to operate the equipment and move pieces of the system.

4.2 Inspection of Shipment

Upon receiving the equipment:

1. Ensure that all pieces of equipment are present and not damaged.
2. Report shipping damage to the carrier before the carrier leaves your facility. All claims must be filed before the carrier leaves the unloading site.
3. Report any missing components to NBE immediately.
4. Remove shipping supports from the equipment.
5. Plan the order in which to move/place the pieces of the equipment. The piece of the equipment containing the datum point should be positioned first.

4.3 Installation Guidelines



NOTICE: All plumbing and wiring must meet or exceed all federal, state, and local codes/standards, and must be installed by qualified personnel.



WARNING: This equipment poses a tip-over hazard if not anchored to the floor. The equipment **MUST** be anchored to the floor.



NOTICE: The customer is responsible for evaluation and guarding of any open sides of the equipment.

1. Review the mechanical drawings for layout and dimensions.

Refer to **mechanical drawing A291028** for footpad and anchor hole location, general arrangement, and dimensional information.

NBE provides a footpad loading diagram, located in the mechanical drawings provided with this manual. This diagram provides the loading at each foot pad, along with footpad dimensions and anchor hole locations. Based on the footpad loading information, equipment foundation, and anchor hole diameter, the required anchor bolt can be selected.



NOTICE: Ensure that all gaskets shipped with the equipment are installed at the corresponding connections. Gaskets are shown on the mechanical drawings for reference.

2. Install each discharger as follows:
 - a. Move the discharger with factory-assembled guard panels into place.
 - b. Level, then anchor to the floor, maintaining proper clearance.
3. Perform the following items related to the hydraulic power unit:
 - a. Move hydraulic power unit into place and anchor to the floor.

- b. Re-connect the hydraulic lines from the hydraulic power unit to the valve stack.
 - c. Ensure hydraulic unit reservoir contains **40 gallons of FM32/equivalent hydraulic fluid**.
4. Perform electrical installation, including the following items:
- Re-connect Unloading Valve Solenoid from hydraulic tank to designated terminals in main panel.
 - Provide Customer Remote Auto signal to designated terminals in the main panel.
 - Wire designated terminals in main panel to provide Customer Hopper High Level and Customer Hopper Low Level signals to NBE PLC
 - Re-connect hydraulic power unit motor wires to designated terminals in main enclosure.

Refer to **electrical schematic 04790200** for details.





! **NOTICE:** Pursuant to agreement, customer has agreed to be responsible for the final installation and integration of the controls onto the equipment. Although NBE is supplying the specified control components as provided in the Agreement, it bears no responsibility for installing, integrating or reviewing the installation or integration of the controls by the customer. Further, any comments offered by NBE in this manual pertaining to electrical installation and/or integration are simply general recommendations for the customer's consideration and it shall be the customer's responsibility to ensure that the final electrical installation and/or integration meets all applicable codes and is appropriate for customer's particular process. Finally, it shall be customer's responsibility to conduct an appropriate process hazard analysis or risk analysis to ensure that the final electrical installation and integration of the controls is appropriate for the customer's particular process.

5. Connect the required energy sources to the equipment. Refer to the appropriate schematics for information on utility requirements and connecting energy sources required for your equipment.
- Electrical Supply Requirement: 460 VAC/3 PH/60 HZ
6. Ensure that a means of shutoff and lockout/tag-out is present for every energy source.
7. As applicable, verify that motors rotate in the direction shown on the arrow decal on the motor. If multiple motors are present, rotation of one motor does not represent that of the other motors.

4.4 Hydraulic Valve Setup

Refer to the Maintenance section for information on adjustment of hydraulic valves.


5. Sequence of Operation

-  **NOTICE:** Devices on this equipment require the presence of the customer remote auto signal to permit operation in auto mode. The sequence below assumes the presence of the customer remote auto signal.
-  **WARNING:** This equipment has moving actuators/devices. Before operating equipment, always confirm that the operating envelope is clear of personnel, including self, to avoid crushing or pinch hazards.
-  **WARNING:** Machine operations occur automatically. Do not place any part of the body on or near moving devices/components of the machine. Ensure all guarding is in place and functional before operating the machine.
-  **NOTICE:** To stop motion, turn the Discharger Hand/Off/Auto switch to the Off position or release the Discharger Return/Off/Rotate selector switch.

5.1 Start-Up

1. Turn on the main electrical disconnect.
2. Pull E-Stop button.
3. Press MCR Reset/Power On pushbutton to enable power to equipment.
4. Clear the light curtain.
5. Press the Light Curtain Reset pushbutton.
6. Before loading a container, ensure discharger bucket is fully lowered (home position). If not, turn the Discharger Hand/Off/Auto switch to the Hand position, then hold Discharger Return/Off/Rotate switch in Return position until the discharger bucket is fully lowered.

5.2 Operating Sequence

1. Load palleted container onto seal platform.
-  **NOTICE:** Discharger capacity is 1500 lbs. Do not exceed discharger capacity.
2. Step back, out of the light curtain, then press the Light Curtain Reset pushbutton.
3. Turn the Discharger Hand/Off/Auto switch to Auto position.
4. Turn (and release) Discharger Return/Off/Rotate switch to Rotate position.

Hydraulic pump runs

Unloading Valve solenoid energizes. Discharger Seal solenoid energizes until Discharger Sealed sensor is made, then remains energized for the preset Seal Time. When Seal Time elapses, Discharger Seal and Unloading Valve solenoids de-energize

NOTE: If Customer Hopper High-Level relay is turned off and Customer Hopper Low-Level relay is turned off, the following rotate sequence occurs. If either or both relays are on, the discharger waits until both are turned off before the rotate sequence occurs.

Rotate Sequence:

Unloading Valve solenoid energizes. Discharger Rotate solenoid and Discharger Rotate Check-Valve solenoid energize. Pivot cylinders extend until Discharger Rotated position sensor is made. Discharger Rotate, Discharger Rotate Check-Valve, and Unloading Valve solenoids de-energize. Unloading Valve solenoid de-energizes preset Auto-Return Time starts

Hydraulic pump stops running when preset Hydraulic Pump Shutdown Delay time elapses

Material discharges into customer equipment

NOTE: The Customer Hopper Low-Level relay will turn on. The Customer Hopper High-Level relay may or may not turn on.

If preset Auto-Return time has expired and Customer Hopper High-Level relay is on, discharger cannot return

If preset Auto-Return Time has expired and Customer Hopper High-Level relay is off, discharger return sequence occurs as follows **(*)**

Return Sequence:

Hydraulic pump runs

Unloading Valve solenoid energizes. Discharger Return and Discharger Return Check solenoids energize. Pivot cylinders retract, rotating bucket/container back, until Discharger Home position sensor is made. Discharger Return, Discharger Return Check, and Unloading Valve solenoids de-energize

Unloading Valve solenoid energizes. Discharger Unseal solenoid energizes. Seal cylinders extend (unseal and lower tote from hood) until Discharger Unsealed position sensor is made, then remains energized for the preset Unseal Time. When Unseal Time elapses, Discharger Unseal and Unloading Valve solenoids de-energize

Hydraulic pump stops running when preset Hydraulic Pump Shutdown Delay time elapses

5. Unload container from seal platform.
6. Repeat sequence as needed.

(*) The auto-return operation can be overridden/bypassed as follows: turn (and release) Discharger Return/Off/ Rotate selector switch to Return position before the Auto-Return timer elapses.

6. Pushbuttons and Selector Switches

Emergency Stop pushbutton: Disables all 24 VDC MCR outputs, including all light curtain relay-powered outputs, simultaneously.

- Illuminates when pressed, if incoming power is connected.
- Pull to reset, then, press MCR Reset/Power On pushbutton. Correct any unsafe conditions before resetting.

MCR Reset/Power On pushbutton: Resets the MCR, if the E-Stop has been reset, and enables 24 VDC MCR outputs, including all light curtain relay-powered outputs, simultaneously. Illuminates when pressed, if the MCR is successfully energized.

Light Curtain Reset pushbutton: Illuminates to indicate that the light curtain has been tripped, and resets the light curtain relay (if light curtain is clear).

Discharger Hand/Off/Auto switch: Selects the discharger operating mode as follows:

- Turn switch to Hand position to operate the discharger in manual mode.
- Turn switch to Off position to turn off the discharger.
- Turn switch to Auto position to operate the discharger in auto mode, as described in the Sequence of Operation.

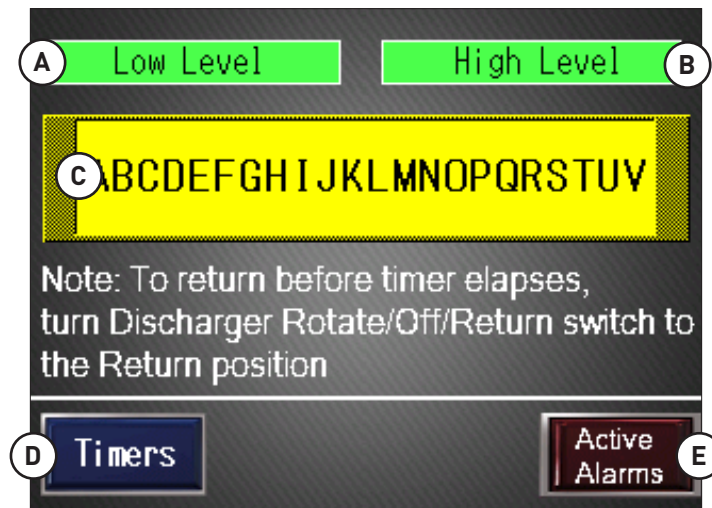
Discharger Return/Off/Rotate switch: Operates the discharger as follows:

- Hand (Manual) Mode: Turn and hold the switch in Rotate position to seal and rotate the container to discharge position. Turn and hold the switch in Return position to rotate the discharger to home position and unseal the container. Release switch to stop motion with the discharger remaining in the current position.
- Auto Mode: Turn the switch to Rotate position, then release switch, to activate the automatic sequence, as described in the Sequence of Operation section. The discharger automatically returns when the Auto-Return timer has elapsed. The switch can, however, be rotated to Return position in order to override the Auto-Return timer.

7. HMI Screen Descriptions

This equipment is supplied with a Pro-face HMI unit. The equipment sequence of operation corresponds to the functions available on the HMI screens. This section provides a summary of HMI screen functionality and related procedures.

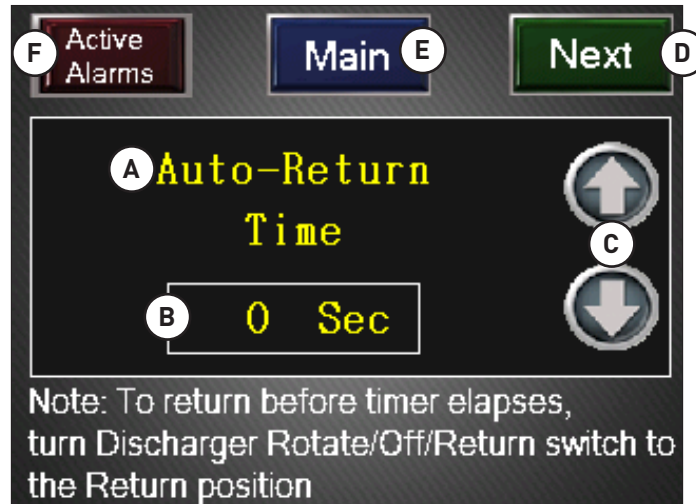
7.1 Main Screen



BUTTON AND INDICATOR DESCRIPTIONS

- A) Low Level indicator: Illuminates to indicate the Customer Hopper Low-Level relay is on.
- B) High Level indicator: Illuminates to indicate the Customer Hopper High-Level relay is on.
- C) Message display: Displays current system action or required operator action.
- D) Timers button: Accesses the Timers screen.
- E) Active Alarms button: Accesses the Active Alarms screen.

7.2 Timers Screen



BUTTON AND INDICATOR DESCRIPTIONS

- A) Timer Name display: Displays the timer name that is currently selected for editing. Press the Next button to access the next timer. Refer to Available Timers section below for available timers and descriptions.
- B) Timer Display/Modify button: Displays current timer timer and enables editing of the selected timer. Refer to Available Timers section (following) for available timers and descriptions. Refer to Timer Modification Procedure (following) for instructions on timer adjustment.
- C) Increase/Decrease buttons: Increase/decrease the timer incrementally.
- D) Next button: Accesses the next available timer for display/editing.
- E) Main button: Accesses the Main screen.
- F) Active Alarms button: Accesses the Active Alarms screen.

AVAILABLE TIMERS

Seal Time: Time allotted for lift/seal operation, during which the seal cylinder retracts to lift/seal the container to the hood. The timer starts when the Discharger Sealed position sensor is made. When time elapses, motion stops. Range: 0-30 seconds.

Unseal Time: Time allotted for lower/unseal operation, during which the seal cylinder extends to unseal/lower the container from the hood. The timer starts when the Discharger Unsealed position sensor is made. When time elapses, motion stops. Range: 0-30 seconds.

Auto Return Delay Time: Time, starting when Discharger Rotated sensor is made, until discharger auto return sequence begins (discharger rotates to home position, then container unseals from hood). Range: 0-600 seconds. NOTE: If timer expires and Customer Hopper High-Level relay is on, discharger cannot return to home position.

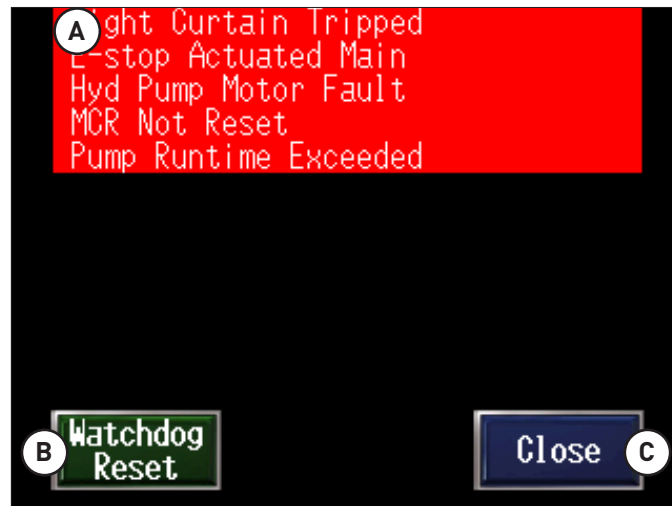
Hydraulic Pump Shutdown Delay: Time, starting when no hydraulic valve solenoids are energized (no request for motion), until the hydraulic pump motor stops running. Range: 0-600 seconds.

TIMER MODIFICATION PROCEDURE

To adjust a timer:

- 1) Select the desired timer by pressing the Next button until the timer name displays on the Timer display.
- 2) Press the Timer Display/Modify button, then enter the desired value on the keypad.
Or
Press the Increase/Decrease buttons to increase or decrease the value incrementally.
- 3) Repeat for additional timers.

7.3 Active Alarms Screen







BUTTON AND INDICATOR DESCRIPTIONS

- A)** Fault display: Displays current, active faults. To reset a fault, resolve the fault condition described in the fault message, then close the Active Alarms screen. *Refer to the Troubleshooting section for information on resolving fault conditions.*
- B)** Watchdog Reset button: Resets the Pump Runtime Exceeded fault, if the fault condition has been resolved. *Refer to the Troubleshooting section for details.*
- C)** Close button: Closes the Active Alarms screen.

8. Maintenance

8.1 Considerations

The recommendations below are a guide; they are not all-inclusive. Use these recommendations, along with the purchased component manufacturer recommendations, to develop a preventative maintenance plan that is fitting for the environment of your equipment.

-  **WARNING:** NO persons, other than qualified personnel, should maintain or service this equipment.
-  **WARNING:** Use caution when servicing fluid power systems. Improper maintenance procedures involving pneumatic or hydraulic systems can cause a device to move unexpectedly, resulting in equipment damage or personnel injury. Safeguard or restrain movable devices in accordance with applicable safety standards before servicing.
-  **WARNING:** Before performing maintenance on this equipment, ensure that all energy sources are properly isolated as described in the Safety–Energy Isolation section.
-  **WARNING:** If ground straps/wires are removed during maintenance, always make sure to re-connect the ground straps/wires when maintenance is complete. Personnel may be exposed to hazardous voltages during normal machine operation if ground straps/wires are not in place.

8.2 Maintenance Schedule

ITEM	FREQUENCY	PROCEDURE/ DETAIL
Equipment Inspection	Weekly	Inspect fasteners. Tighten as needed. Inspect finish. Repair defects to prevent rust/corrosion.
Electrical System; General	See Procedure/ Detail	Weekly: Inspect electrical connection cables for signs of damage, aging, or brittleness. Replace as needed. Weekly: Inspect electrical conduit (rigid and flexible) for damage and loose fittings. Repair/tighten as needed. Weekly: Inspect all switch and power cords for abrasion and insulation defects. Replace if damaged/worn. Every 3 months: Inspect flex track for damage and replace as needed. Every 3 months: Flag sensors and check for change in state on PLC, or use a sensor tester to evaluate functionality. Every 6 months: Ensure terminal connections are tight. Every 6 months: Verify that motor overload settings match setting specified on electrical schematic.
Nylon Locknuts	N/A	If a Nylon locknut has been loosened or fully un-threaded, replace with new Nylon locknut.
Hydraulic System - Return Filter	See Procedure	When pressure gauge reads 25 PSI; if no pressure gauge, every 250 hours of operation. More frequent replacement could be required depending on operating conditions. Use the following procedure to replace filter can: <ol style="list-style-type: none"> 1. Turn off and isolate energy sources, and perform in-house lockout/ tag-out procedure. Release pressure in the filter line. 2. Un-thread the filter can and discard it along with the accompanying seal. A strap wrench may be required. 3. Apply a small amount of lubricant to the new filter can seal. 4. Install the new filter can and hand tighten $\frac{3}{8}$ to $\frac{1}{2}$ turn after gasket makes contact with head.

ITEM	FREQUENCY	PROCEDURE/ DETAIL
Hydraulic System - Suction Strainer	After 1st 6 months operation, then yearly	Inspect for wear and clogging and clean/replace as needed. Clean strainer using non-caustic solvent at time of hydraulic system fluid replacement.
Hydraulic System - Breather	4000 hours of operation	Inspect for wear and clogging and clean/replace as needed.
Hydraulic System - Hoses and Connections	Weekly	Inspect hydraulic hoses for wear and connections for tightness. Replace worn hoses. Inspect area beneath hydraulic hoses/connections for hydraulic fluid. If fluid is present, this may indicate that a hose is worn/damaged or a connection is loose.
Hydraulic System - Fluid	Yearly	Inspect fluid level and condition. Fill/replace as needed. Hydraulic fluid type is FM32/equivalent for food grade applications Quantity required is 40 gallons.
Hydraulic Cylinders	Monthly	Inspect the following items: <ul style="list-style-type: none"> • Pivot points for wear (elongated pin holes) and repair as needed • Hydraulic connections to ensure tight • Gland seal for leakage and repair as needed
Track Roller Bearings	N/A	Bearings are sealed. Replace if the bearing makes noise, seizes, leaks grease, or rolls unevenly on track
Fiberglide Bearings	N/A	If chattering or squealing is observed during pivot motion, replace Fiberglide bearings as described in Maintenance—Banjo Pin and Fiberglide replacement section

8.3 Hydraulic System Maintenance



WARNING: Hydraulic systems and hydraulically-powered devices must only be serviced by qualified, hydraulic technicians.

8.3.1 Initial Setup

For testing purposes, the hydraulic reservoir is serviced with ISO FM32 industrial grade hydraulic oil. Per DOT regulations, the reservoir may be drained prior to shipment; however, the hydraulic cylinders and lines are not purged. If the reservoir will be filled with oil that adversely reacts with the oil used for testing, completely drain and purge the entire system before filling.

Fill the reservoir to approximately 1" below the fill point with **FM32/equivalent for food grade applications**. **Quantity required is 40 gallons.**

Remove and clean suction strainer and replace return-line filter (if applicable) after 1st week of operation to remove foreign material flushed into external plumbing.

8.3.2 Preventative Maintenance

Check hydraulic fluid level and condition yearly (or at higher frequency for dirtier environments). Fill or replace as needed. Ensure that new hydraulic fluid is stored in a clean container.

Clean/replace the strainer, return filter, and breather as recommended in the Maintenance Schedule section.

Clean up dirt, debris, and/or contaminants that are on or around the hydraulic system as needed. Cleanliness is the most important factor in the lifespan of hydraulic components. Do not allow dirt into the reservoir during filling.

Inspect hydraulic hoses for wear and connections for tightness. Replace worn hoses. Inspect area beneath hydraulic hoses/connections for hydraulic fluid. If fluid is present, this may indicate that a hose is worn/damaged or a connection is loose.

8.3.3 Operating Conditions

Pressure: Operate at lowest possible pressure setting to prevent unnecessary fluid heating. In some applications, this setting may be 50-200 PSI above necessary static pressure to overcome dynamic pressure drop or achieve proper acceleration.

Temperature: Operate your equipment within the appropriate temperature range. Refer to the manufacturer recommendations for the operating temperature range. Refer to your oil data sheet for temperature range.

8.3.4 Troubleshooting

Consistent, excessive noise from the pump (during operation) may indicate cavitation. If cavitation is suspected, ensure that the strainer is positioned properly and the connection is tight, and ensure that the hydraulic fluid level is adequate.

8.4 Hydraulic Valve Settings

This equipment uses hydraulic-powered actuators to perform some operations. This section describes the hydraulic circuit and adjustable valve settings. For additional information, refer to the hydraulic schematic for your equipment.

Hydraulic Power Unit: Controls hydraulic pressure to system hydraulic circuit.

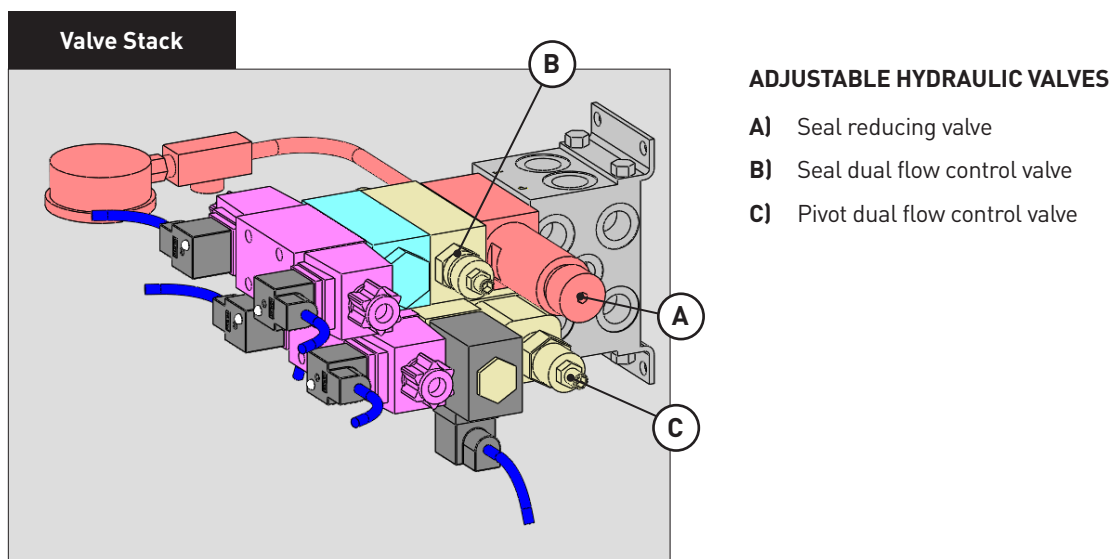
- Relief valve controls total system pressure. Set via relief valve (on hydraulic power unit) at approximately 1500 PSI.
- Pressure enable solenoid valve enables pressure to entire hydraulic circuit (all hydraulic functions). If the hydraulic motor runs but the main gauge reads zero pressure, ensure that this valve functions properly.

Seal Circuit: Controls seal cylinder motion when lifting to or lowering from the hood.

- Reducing valve (A) controls seal cylinder working pressure for lifting the container to the hood. Set at approximately 50-100 PSI above pressure required to lift full container. Refer to Seal Pressure Set-up Procedure for instructions.
- Dual flow control valve (B) controls speed of seal cylinder motion when lifting the container to the hood, or lowering from the hood. Adjust lifting speed on B-port and lowering speed on A-port.
- Set the Seal (Retract) flow control to (4) full turns out from the closed (fully-turned-in) position. Set the Unseal (Extend) flow control to (4) full turns out from the closed (fully-turned-in) position. NOTE: (5) rotations outward from the closed position is the fully-open position.

Pivot Cylinder Circuit: Controls pivot cylinder motion when extending/rotating container to discharge position and retracting/rotating to home position.

- Dual flow control valve (C) controls speed of pivot cylinder motion when extending/rotating container to discharge position, or retracting/rotating to home position. Adjust raise speed on B-port, and lower speed on A-port.
- Set the Rotate (Extend) flow control to (4) full turns out from the closed (fully-turned-in) position. Set the Rotate Home (Retract) flow control to (3) full turns out from the closed (fully-turned-in) position. NOTE: (5) rotations outward from the closed position is the fully-open position.
- NOTE: Variable speed of pivot cylinder motion allows controlled motion of the container and bucket as the load shifts over-center.



8.4.1 Seal Pressure Setup Procedure

1. Use the HMI to set the Seal timer to approximately 30 seconds for set-up purposes.
2. Begin setup with the seal pressure reducing valve set to approximately 200 PSI.
3. Load a full container onto the seal platform.
4. Use controls to attempt to raise seal platform.
5. Increase seal pressure in ½ turn increments (clockwise to increase) until smooth motion of the seal platform is observed.
6. Increase seal pressure by an additional ½ turn. NOTE: The factory preset is 750 PSI for totes or boxes.
7. Visually inspect the container-to-hood seal to confirm that the seal is complete. No space should be present between top edge of container and hood.
8. Use controls to fully lower seal platform.
9. When seal pressure set-up is complete, use the HMI to set the Seal timer as follows: use controls to raise seal platform. When the seal platform is at the Seal proximity switch, record the time (seconds) it takes for the platform to raise fully until motion stops. Use this time as the Seal timer setting.

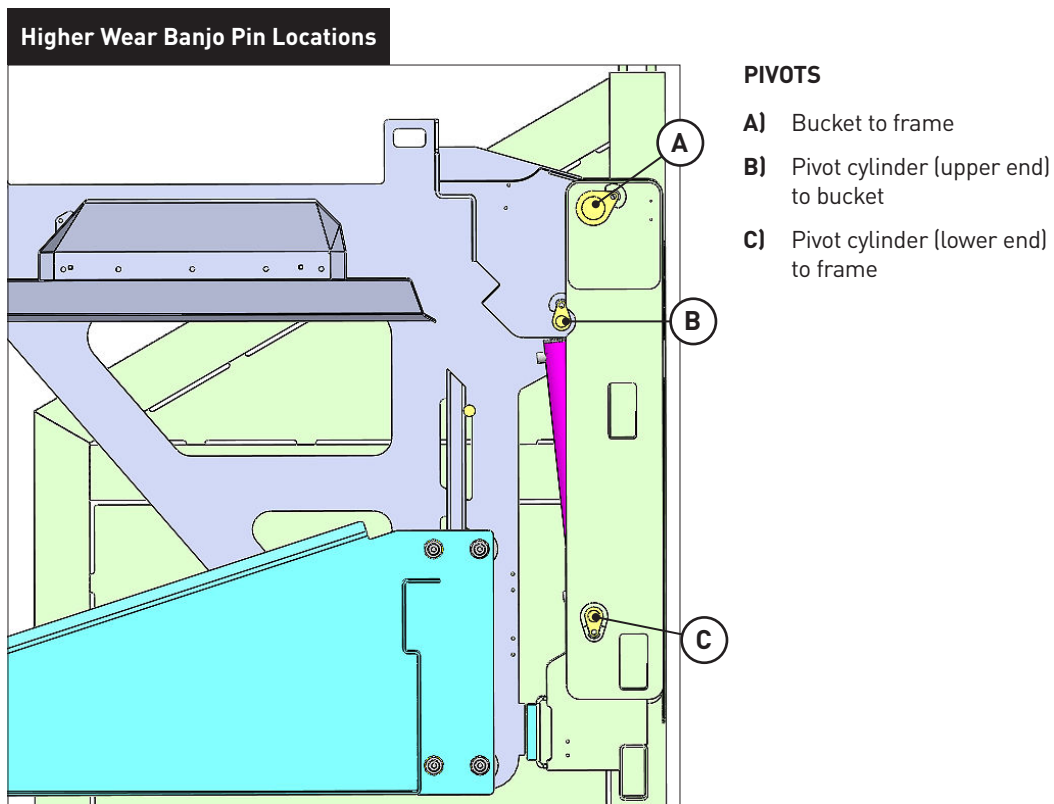
8.5 Banjo Pin and Fiberglide Replacement

⚠ WARNING: NO persons, other than qualified personnel, should maintain or service this equipment.

⚠ WARNING: Before performing maintenance on this equipment, ensure that all energy sources are properly isolated as described in the Safety–Energy Isolation section.

8.5.1 Banjo Pin Replacement Recommendations

Locations of banjo pins are listed below and shown in graphic. Replace banjo pins when wear is present. Pivots that rotate about banjo pins contain Fiberglide bushings, which may also require replacement when wear is present. For instructions on Fiberglide replacement and banjo pin replacement, refer to the Banjo Pin and Fiberglide Replacement section on the following page.

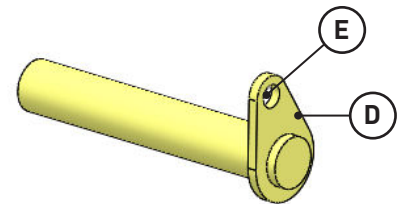
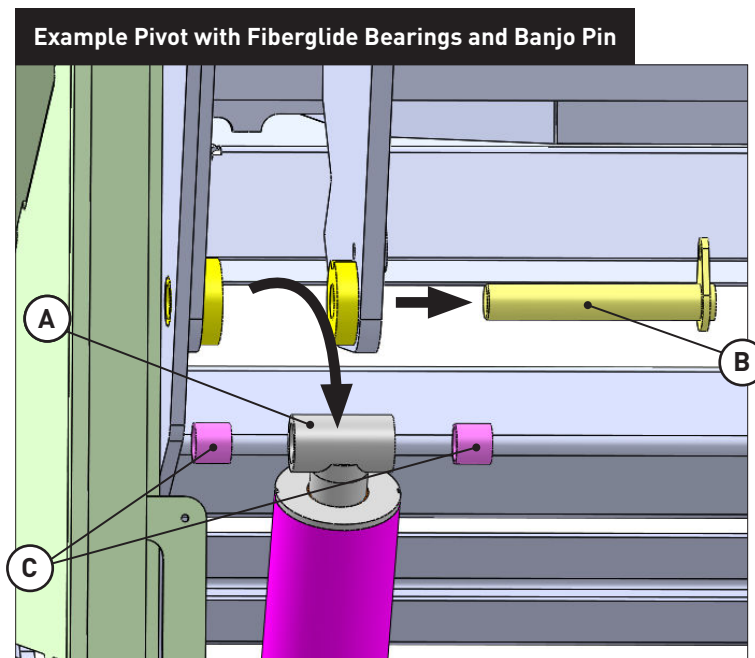


8.5.2 Banjo Pin and Fiberglide Replacement

This equipment has banjo pins—pivot pins with anti-rotation retainers—that connect rotating components. High-wear banjo pins, and the surrounding Fiberglide bearings, may require replacement.

To install a new banjo pin and Fiberglide:

1. Begin with the bucket in home position (fully lowered).
2. Turn off and isolate energy sources, and perform in-house lock-out/tag-out procedure.
3. Remove the bolt (E) that holds the banjo pin (B) in place.
4. Remove the banjo pin (B).
5. Remove the Fiberglide (C) from the inside of the pivot tube (A) as follows: place a tapered-edge tool (such as a chisel) between the edge of the pivot tube and the Fiberglide. Using a hammer, tap the tool toward the center of the pivot tube to roll the Fiberglide inward (at the seam). Use care to avoid damaging the pivot tube.
6. Once the Fiberglide is rolled inward, grip the edge with pliers, and pull out the Fiberglide.
7. Repeat steps 5-6 from the opposite side of the pivot tube (A) for the second Fiberglide.
8. Place the new Fiberglide (C) at the edge of the pivot tube.
9. Use the banjo pin as a guide/tool for Fiberglide installation as follows:
 - a. Insert the banjo pin into Fiberglide up to banjo pin flange (D).
 - b. Using a hammer, tap the banjo pin to squarely guide both the banjo pin and Fiberglide into the pivot tube. The inside of the pivot tube is stepped to properly locate the Fiberglide.
 - c. Remove the banjo pin.
10. Repeat steps 8-9 from the other side of the pivot tube to install the second Fiberglide.
11. Ensure all pivot holes are aligned, then insert the banjo pin through all pivot holes.
12. Replace and tighten the banjo pin locating bolt.



COMPONENTS

- A) Pivot tube
- B) Banjo pin
- C) Fiberglide
- D) Flange retainer (on banjo pin)
- E) Bolt location (on banjo pin)

Note: The example pivot shown above includes Fiberglide bearings within a cylinder tube. Other pivot locations may not include a cylinder tube but instead a tube within a weldment on the equipment.

9. Troubleshooting

9.1 Resolving Faults Using the HMI

This equipment has an HMI unit that displays fault (alarm) messages and allows fault reset. If a fault displays on the HMI:

1. Check the fault message to determine the cause of the stoppage. The fault message gives a description of the fault condition.
2. Address the fault condition.
3. Reset the fault by closing the Active Alarms screen.

9.2 NBE Service

NBE maintains a service organization at its Holland, Michigan facility. Troubleshooting and other telephone support is available during normal business hours. Site support will be quoted as required. Contact our service department at (616) 399-2220.

9.3 Problem/Solution Table



WARNING: Before performing maintenance/troubleshooting on this equipment, ensure that all energy sources are properly isolated as described in the Safety—Energy Isolation section.

PROBLEM	POTENTIAL CAUSE	SOLUTION
Power is on but controls do not function	<i>E-Stop Actuated Main</i> displays on HMI	Pull E-Stop, then press MCR Reset/Power On pushbutton
	Light curtain obstructed; <i>Light Curtain Tripped</i> displays on HM	Clear light curtain, then press Light Curtain Reset pushbutton
	Light curtain not reset	Press Light Curtain Reset pushbutton
	<i>MCR Not Reset</i> displays on HMI	Press the MCR Reset/Power On pushbutton
Discharger does not operate in auto mode	Auto mode not selected	Turn Discharger Hand/Off/Auto switch to Auto position
	Customer remote auto signal is not present	Provide customer remote auto signal
Auto-Return Time has expired, but discharger does not auto-return to Home position	Customer Hopper High-Level relay is on	Address customer hopper high level condition
<i>Pump Runtime Exceeded</i> fault displays on HMI	Hydraulic cylinder has not been sensed retracted, causing pump to run in excess of programmed time limit	Inspect hydraulic cylinders, valves, pump, position sensors, and surrounding are (for interference). Address the fault condition accordingly. When fault is resolved: access the Active Alarms HMI screen, press the Watchdog Reset button, then close the Active Alarms HMI screen
Hydraulic cylinder does not actuate properly	Mechanical bind on cylinder rod	Repair or replace rod
Hydraulic cylinder leaks oil	Damage or wear to cylinder seal	Replace cylinder seal

PROBLEM	POTENTIAL CAUSE	SOLUTION
Squealing or chattering during pivot motion	Banjo pin and Fiberglide bearing need to be replaced	Refer to Maintenance–Banjo Pin Replacement section for instructions
Discharger cannot lift container	Hydraulic valve setting needs to be adjusted	Refer to Maintenance–Hydraulic System Maintenance section for instructions
	Container exceeds capacity	Discharger capacity is 1500 lbs. Do not exceed capacity
Discharger pivot/rotation motion does not occur at desired speed	Hydraulic valve setting needs to be adjusted	Refer to Maintenance–Hydraulic System Maintenance section for instructions
Incomplete seal of container during discharge; leakage of material	Incomplete container-to-hood seal	Adjust seal pressure. Refer to Hydraulic System Maintenance—Seal Pressure Setup Procedure section for instructions.
		Seal Time needs to be adjusted. Refer to Hydraulic System Maintenance—Seal Pressure Setup Procedure section for instructions.
Hydraulic pump does not run; <i>Hyd Pump Motor Fault</i> displays on HMI	Short-circuit condition Current overload fault (continued small overcurrent condition)	<p>Before entering the enclosure, turn off electrical power.</p> <p>Open the enclosure.</p> <p>Check whether motor protection circuit breaker is tripped (halfway between the Off and On positions). If so, proceed as follows:</p> <p>First, confirm that the trip current setting on the motor protection circuit breaker is correct. The setting should be the motor FLA (full load amps). If trip setting is not correct, adjust the setting.</p> <p>Second, reset motor protection circuit breaker as follows:</p> <ol style="list-style-type: none"> 1. Allow proper time for motor overload to cool. 2. The tripped motor protection circuit breaker will be halfway between the Off and On positions. First turn to Off position to reset, then turn to On (vertical) position. Close enclosure.

10. Warranty

NBE (Seller) warrants products manufactured by it and supplied hereunder to be free of defects in materials and workmanship under normal use and proper maintenance for a period of one (1) year from the date of shipment. If within such period, any such products shall be proved to Seller's sole discretion to be defective, such products shall be at Seller's option repaired or replaced. Seller shall be responsible for labor charges in connection with repair or replacement for a period of ninety (90) days from date of shipment, but only for repair or replacement within the continental United States and Canada. All other labor charges shall be billed to Buyer at Seller's then prevailing rates, including travel and lodging expenses. Seller's obligation and Buyer's exclusive remedy hereunder shall be limited to such repair and replacement and shall be conditioned upon Seller receiving written notice of any alleged defect no later than ten (10) days after its discovery within the warranty period. At Seller's option, the Seller may require return of such products to Seller when such return is feasible. Seller reserves the right to satisfy all of its warranty obligations by reimbursing Buyer for all amounts Buyer has paid to Seller for such product upon which Buyer shall immediately return the product(s) to Seller. The foregoing warranty is not applicable to: (i) accessories and components not manufactured by Seller, which are warranted only to extent, if any, of the manufacturer's warranty for such accessories and components (but the warranty term for any such warranty shall be the expiration date of such warranty, or one year from date of shipment, whichever is the first to occur), or (ii) damages caused by shipping. Seller shall be responsible for freight charges for replacement parts only if shipped within the continental United States or Canada.

The foregoing warranty is exclusive and in lieu of all other express and implied warranties (except of title) including but not limited to implied warranties of merchantability, fitness for a particular purpose, performance, or otherwise. All other warranties are expressly disclaimed. Buyer agrees that in no event shall the Seller be liable for claims (based upon breach of express or implied warranty, negligence, product liability, or otherwise) for any other damages, whether direct, indirect, immediate, incidental, foreseeable, consequential, special or based on any other claim.

11. Appendix

11.1 Mechanical Drawings

Mechanical assembly drawings for your equipment follow this page.

11.2 Controls Schematics

Schematics for your equipment follow this page.

11.3 Recommended Spare Parts List

Recommended spare parts for your equipment follow this page. When selecting parts to order from this list, consider the following:

- The Quantity (QTY) column provides the actual quantity of the component on the equipment. The user/owner of the equipment should consider factors such as equipment environment, component lead-time, and operating hours of the equipment to determine the spare quantity to purchase.
- Refer to the Mechanical Drawings and Controls Schematics for the location of the components on the equipment.
- To order spare parts, contact the NBE Parts Division at parts@nbe-inc.com.

11.4 Purchased Component Manufacturer Cut Sheets

Purchased component cut sheets follow this page.



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Note: NBE has a policy of continuously developing all equipment and accessories. Therefore, NBE reserves the right to make changes to NBE models from time to time. No claims can be made based on the information and illustrations contained in this manual.