FORTA DELIVERY SYSTEMS
STRONGER LASTING™

Voyager Bulk Fiber Dispensing System

Operating Instructions

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FORTA® Corporation

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Contents

Chapter 1

Overview

System description

The Voyager bulk fiber dispensing system dispenses synthetic fiber reinforcement into an asphalt or concrete manufacturing process, or other process where synthetic fibers are required. The Voyager system can be installed as a stationary system in a plant or other facility or, if a mobile setup is desired, it can be installed in a fully-enclosed mobile trailer so that it can be moved from site to site. Two drum capacities are available: standard and large. The mobile system is available with the standard drum only.

The Voyager can be purchased with one of two operating options: a continuous feed model or a batch feed model:

- A continuous feed model operates continuously at a user-defined feed rate. It constantly monitors the feed rate and makes adjustments to the drum speed as needed to maintain that feed rate throughout the job. Continuous feed models are *typically* used in an asphalt manufacturing process, but may also be used in a concrete manufacturing process or other continuous process that requires fiber.
- A batch feed model operates at a fixed feed rate until a user-defined amount of fiber has been dispensed. Batch feed models are *typically* used in a concrete manufacturing process or other batch process that requires fiber.

Installation

Mobile system

If your Voyager bulk fiber dispensing system is in a mobile trailer, the trailer must be at the desired site and the system must be properly and completely setup before the Voyager system can be operated. Refer to the separately supplied "Quick Guide - Prepare Mobile System for Operation".

In a likewise fashion, when operation of the Voyager is complete at one location and you wish to move it to another location, the mobile system must be properly and completely prepared for transport before it can be moved. Refer to the separately supplied "Quick Guide - Prepare Mobile System for Transportation". Damage can result if the system is not prepared properly before transport.

Stationary system

If your Voyager bulk fiber dispensing system will be used at a processing plant, it must be properly and completely installed at the plant before the Voyager system can be operated. Refer to the separately supplied "Quick Guide - Installation for Fixed Operation".

System basics

Figure 1 identifies the main components of the Voyager system. Refer to Table 1 for a basic description of each component. For proper operation of the system, it is important to be able to identify these components and understand their basic function.

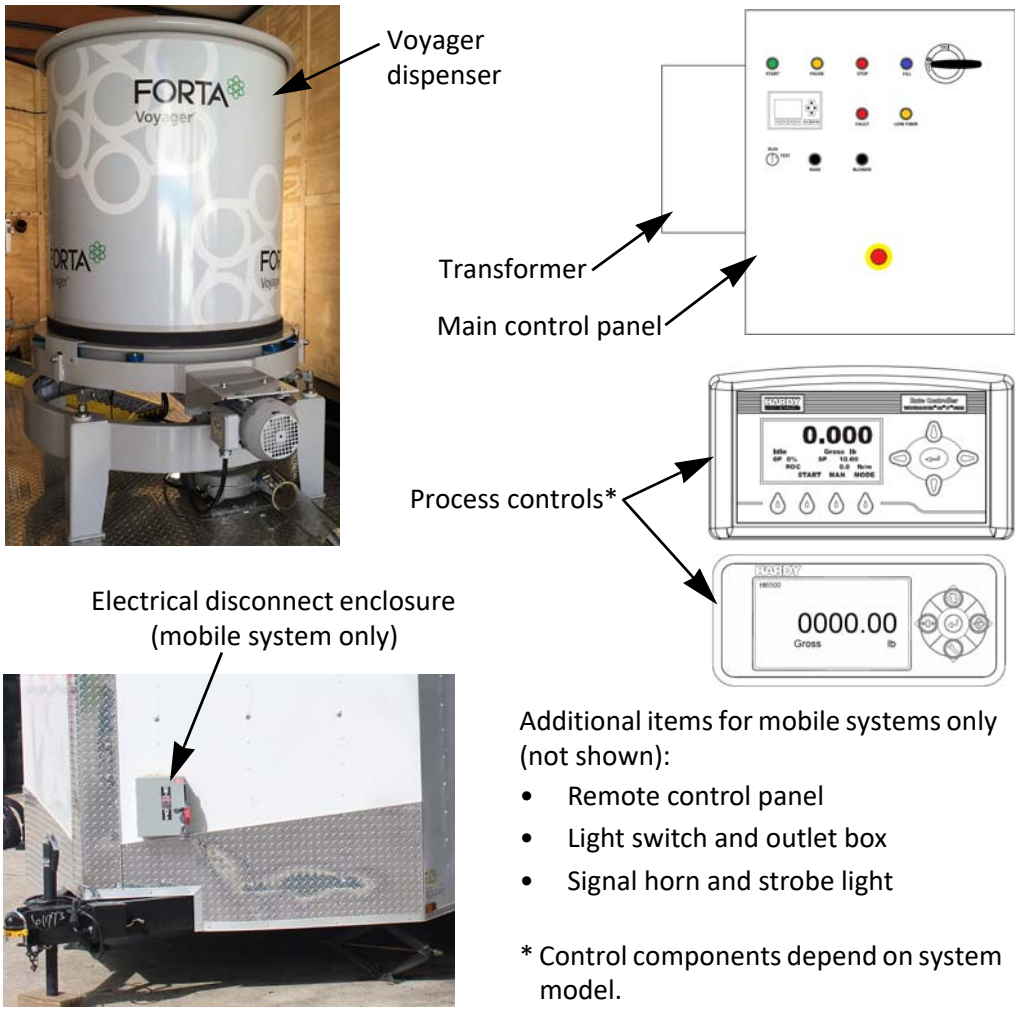


Figure 1: Components of the Voyager bulk fiber dispensing system (see Table 1).

Table 1: Components of the Voyager bulk fiber dispensing system (see Figure 1).

Component	Description
Voyager dispenser:	Dispenses fiber into the asphalt or concrete job at the rate or amount specified by the user through the rate controller. See Chapter 2 for more information.
Main control panel:	Controls operation of the Voyager dispenser. See "Main control panel" on page 14 for more information.
Remote control panel:	Optional - mobile systems only. Provides a set of alternate controls for the Voyager system that can be used at a remote location from the mobile trailer. See "Remote control panel (optional)" on page 16 for more information.
Process controls:	The continuous feed or batch feed process is controlled by one or more components. See "Process controls" on page 18 for more information; be sure to refer to the correct model for your system - continuous feed or batch feed.
Signal horn and strobe light:	Provided with mobile systems only. The signal horn and strobe light provide an audible and visual indication that the system is in a low fiber condition (see page 15) or has been shutdown due to a fault condition (see page 29). If the horn and light turn on during operation, you should immediately check the system and resolve any issues that caused the horn and light to turn on. The horn and light are located on the outside of the trailer. The horn will sound as follows: • 3 beeps and a pause (repeated) for low fiber • Continuous for fault condition
Electrical disconnect enclosure:	Provided with mobile systems only. Provides connection for customer's power source to the trailer. Refer to "Electrical disconnect enclosure" on page 13 for more information.
Light switch and outlet box:	Provided with mobile systems only. The light switch controls lights on the inside of the trailer. The outlets provide a 120 VAC power source.

System safety and information labeling

Table 2 explains the meaning or purpose of any safety and information labels that may be affixed to any part of the Voyager system.

Table 2: Descriptions of safety and information labeling.

Label	Meaning or Purpose
	**Rotating parts hazard** - Indicates that a hazard exists from rotating parts inside the equipment. Keep hands clear. Use appropriate lock-out/tag-out procedures before servicing equipment.
	**Pinch hazard** - Indicates that a pinch hazard exists from rollers. Keep hands clear. Use appropriate lock-out/tag-out procedures before servicing equipment.
	**Automatic movement hazard** - Indicates that the machine moves automatically. Stay clear during operation.
	**Electrical hazard** - Indicates that a hazard exists from high voltage or electrical current. Equipment uses a supply voltage of 480 Vac.
	**Shock hazard** - Indicates that an electrical shock hazard exists. Improper use will result in serious injury or death. Power must be disconnected before servicing equipment - use appropriate lock-out/tag-out procedures. Only authorized/trained personnel should service equipment.

Product support

These instructions outline the proper operation and maintenance of the Voyager bulk fiber dispensing system. If technical assistance is necessary, some assistance is available by telephone consultation with FORTA® Corporation Operations Department. For more in-depth assistance, on-site technical services are available through FORTA® Corporation at a cost of the technician's travel, lodging, and time on site. Contact FORTA® Corporation for details; see page 7.

Important

Failure to follow the within instructions, and any other supplied instructions, may void any applicable warranty.

Contact FORTA® Corporation

If it is necessary to contact FORTA® Corporation, you can do so by the following:

Mail: FORTA® Corporation
100 Forta Drive
Grove City, PA 16127-5221
Phone: 1-800-245-0306 or 1-724-458-5221
Fax: 1-724-458-833
Web: www.fortacorp.com

Chapter 1: Overview

Chapter 2

Voyager Dispenser

Specifications

Specifications of the Voyager are listed in Table 3.

Table 3: Specifications of the Voyager.

	Standard Drum	Large Drum
Feed rate (min/max)	Dependent on type and length of fiber	
Drum capacity by volume	33 ft^3 (0.93 m^3)	53 ft^3 (1.5 m^3)
Drum capacity by weight of fiber (Maximum capacity setting)		
Forta-Fi	315 lb (143 kg)	477 lb (216 kg)
Low fiber alarm level by weight of fiber (LOW FIBER indicator setting, 55% of maximum capacity)		
Forta-Fi	175 lb (80 kg)	260 lb (118 kg)
Low fiber shutdown by weight of fiber (Low fiber shutdown setting, 25% of maximum capacity)		
Forta-Fi	80 lb (36 kg)	120 lb (54 kg)

Components

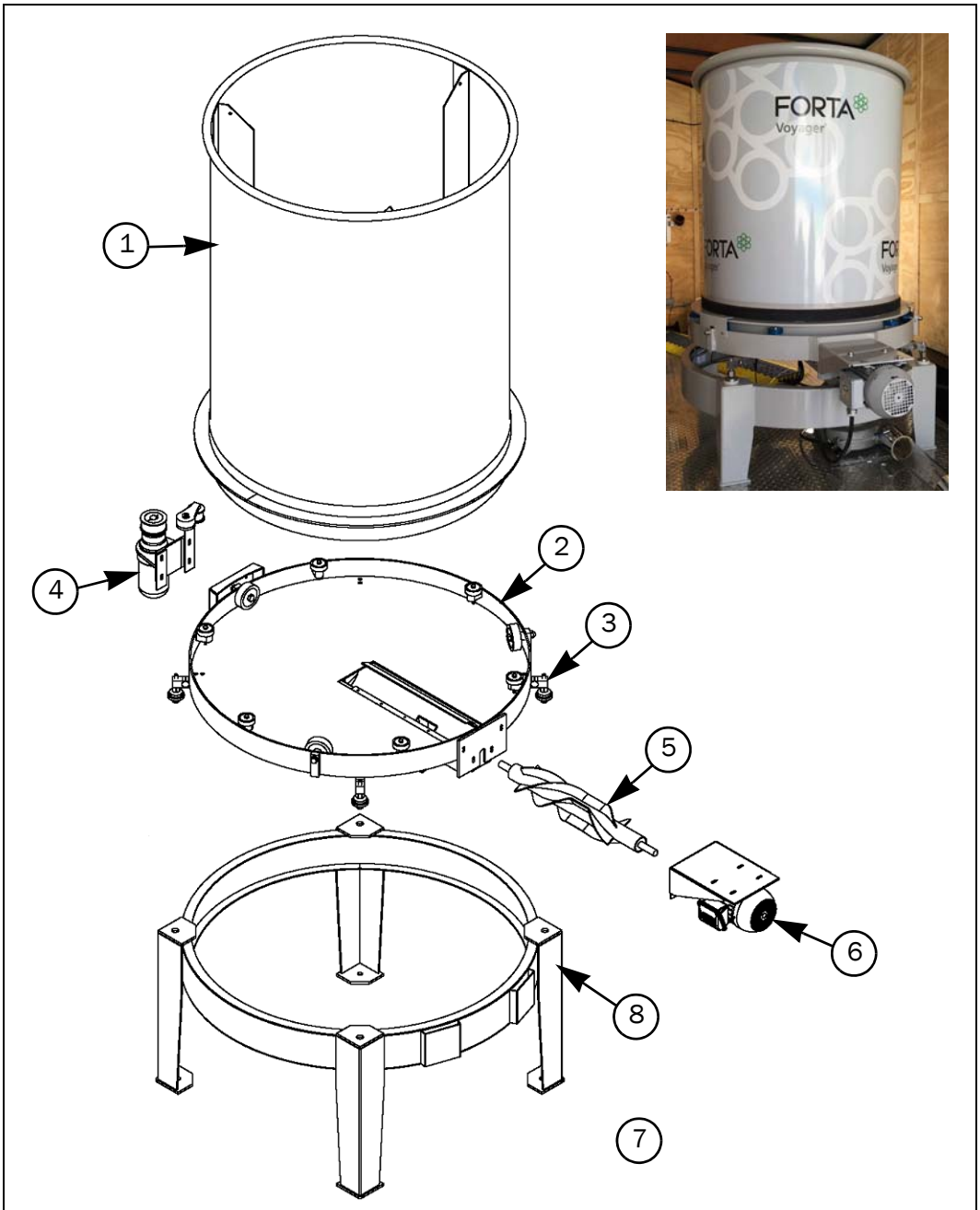


Figure 2: Components of the Voyager dispenser (see Table 4).

Table 4: Components of the Voyager dispenser (see Figure 2).

Component	Description
1. Drum	Holds the fiber to be dispensed. Rotates during operation to move the fibers over the rake.
2. Base	Supports the drum and is equipped with bearings to allow rotation of the drum.
3. Load cells	Detect the weight of the drum and its contents. There are four load cells whose signals are summed to attain total weight. The reading is used to calculate the fiber feed rate and amount of fiber dispensed.
4. Drum motor and drive belt	Rotates the drum so that fiber can be dispensed. The speed of rotation is variable; the faster the drum rotates, the higher the volume of fiber that is dispensed. Drum speed is controlled by the process controls.
5. Rake	Transfers fiber from the drum to the blower.
6. Rake motor	Rotates the rake at a constant speed.
7. Blower	Not shown. Transfers the fiber through the discharge tubing to the processing location.
8. Stand	Supports the Voyager and provides a solid connection point for the load cells.

Chapter 2: Voyager Dispenser

Chapter 3

Controls and Electronics

Electrical disconnect enclosure

The electrical disconnect enclosure is provided with mobile systems only. It is located on the outside of the trailer and provides connection of power from the customer's power source to the trailer. The service box then feeds power to all the components inside the trailer. The box has a lockable disconnect switch.

For connection information, refer to the separately supplied "Quick Guide - Prepare Mobile System for Operation"

Figure 3: The electrical disconnect enclosure.

Main control panel

Figure 4: The main control panel.

Table 5: Controls located on the main control panel.

Control	Description
EMERGENCY STOP button:	Press to stop all operation of the system. The signal horn puts out a continuous beep sound and the strobe light turns on. Should only be used for an emergency stop of the system. For normal shutdown of the system use the **STOP** button. To release the **EMERCENCY STOP** button, turn it clockwise as depicted by the arrows on the knob face; the button should then pop out.
Disconnect switch:	Controls power to the main control panel.
START button and indicator:	Press to start a fiber dispensing job. The dispenser will go through the following startup sequence: the blower immediately turns on, and then 5 seconds later the drum and rake turn on to feed fibers to the blower. At this point the rate controller takes over control of the system. The **START** button illuminates once the drum and rake motors turn on.

Table 5: Controls located on the main control panel. (Continued)

Control	Description
PAUSE button and indicator:	Press to put Voyager into ***PAUSE*** mode. When in ***PAUSE*** mode the rotation of the drum and rake stop which stops feeding fibers to the blower. The blower continues to operate. Both the **PAUSE** and **STOP** buttons illuminate to indicate that the system is in ***PAUSE*** mode. The ***PAUSE*** mode would be used, for example, if the asphalt drum needs to stop for a short time. To resume operation of the job, press the **START** button.
STOP button and indicator:	Press to stop all operation of the dispenser. The **STOP** button illuminates. This button should be used for normal shutdown of the system upon completion of a fiber dispensing job. The blower will continue to run for 5 seconds after the **STOP** button is pressed.
FILL button and indicator:	Press to put system into ***FILL*** mode. Both the **FILL** and **STOP** buttons illuminate to indicate that the system is in ***FILL*** mode. The rate controller switches from running the system in rate control to running at a fixed speed and shows a status of *Refill*. Refer to "Filling the drum during a continuous job" on page 29 for the recommended procedure.
FAULT indicator:	Illuminates when the system is in a fault condition; see "Faults and alarms" on page 29.
LOW FIBER indicator:	Illuminates when the amount of fiber in the drum has reached the low fiber level as set in the rate controller (about 55% of drum capacity, see Table 3 on page 9). In addition, the signal horn and light will activate to give external audible and visual signals that the low fiber level has been reached and the drum needs filled. If the drum is not filled, the Voyager will continue to operate in ***LOW FIBER*** mode until the amount of fiber in the drum has reached the low fiber shutdown level (about 25% of drum capacity, see Table 3 on page 9), at which point the system will shutdown.
RAKE button:	Used only in ***TEST*** mode to check the direction of rotation of the rake motor. This is a momentary contact type button and will only run the rake motor when depressed.
BLOWER button:	Used only in ***TEST*** mode to clear the blower of fibers. This is a momentary contact type button and will only run the blower motor when depressed.
RUN/TEST key switch:	Puts system in either ***RUN*** mode or ***TEST*** mode. ***RUN*** mode is for normal operation of the system. ***TEST*** mode should only be used during setup of the trailer or during maintenance when indicated in instructions; refer to the separately supplied "Quick Guide - Prepare Mobile System for Operation". The key for the switch should be located inside the main control panel.

Table 5: Controls located on the main control panel. (Continued)

Control	Description
Fault Display:	Indicates any system faults. To illuminate the screen (turn on backlight), press the **ESC** button on the fault display. During normal operation, the fault display screen will indicate *NO FAULTS*. There are 6 different fault conditions that will cause the Voyager to shutdown; see "Faults and alarms" on page 29.

Remote control panel (optional)

A remote control panel option is available for mobile systems. It provides basic start and stop control, fault/low fiber detection, and rate monitoring of the Voyager system from a remote location (up to 100 ft). Refer to Figure 5 and Table 6 for descriptions of the controls on the panel.

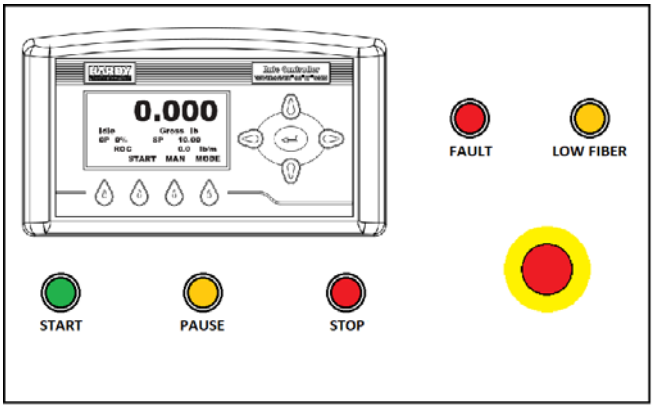


Figure 5: The optional remote control panel.

Table 6: Controls on the remote control panel.

Control	Description
EMERGENCY STOP button:	Press to stop all operation of the system. The signal horn puts out a continuous beep sound and the strobe light turns on. Should only be used for an emergency stop of the system. For normal shutdown of the system use the **STOP** button. To release the **EMERCENCY STOP** button, turn it clockwise as depicted by the arrows on the knob face; the button should then pop out.

Table 6: Controls on the remote control panel. (Continued)

Control	Description
FAULT indicator:	This indicator functions the same as its counterpart on the main control panel; see Table 5.
LOW FIBER indicator:	This indicator functions the same as its counterpart on the main control panel; see Table 5.
START button and indicator:	This button and indicator functions the same as its counterpart on the main control panel; see Table 5.
PAUSE button and indicator:	This button and indicator functions the same as its counterpart on the main control panel; see Table 5.
STOP button and indicator:	This button and indicator functions the same as its counterpart on the main control panel; see Table 5.
Rate control display:	This rate control display mimics the display on the rate controller that is located inside the trailer.

Process controls

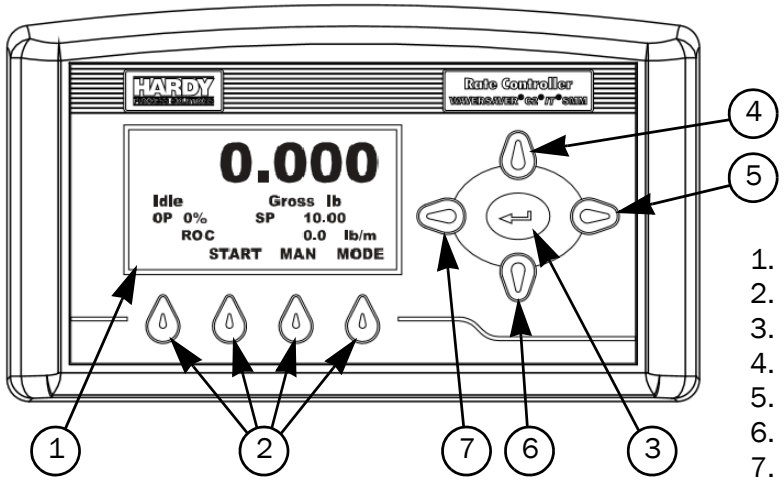
The continuous feed or batch feed process of the Voyager is controlled by process controls. The model, functionality and operation of the process controls vary depending on whether the Voyager system is a continuous feed or batch feed model. Be sure to refer to the appropriate section below for your setup.

Continuous feed model

When the Voyager is provided as a continuous feed model, the continuous feed process is controlled by a rate controller (see Figure 6). The rate controller is configured as a single-ingredient, loss-in-weight rate controller that measures the feed rate of the Voyager. The user enters the desired feed rate (denoted as setpoint (SP) on rate controller), and an algorithm automatically calculates and adjusts the tuning parameters needed to maintain that rate during a job. After comparing the actual feed rate (measured by calculating the loss of weight over short intervals) to the desired feed rate, it computes the adjustments needed to achieve the desired rate and transmits signals to adjust the speed of the drum.

Note

Even with a completely empty drum, the rate controller might not show zero gross weight on the display (GROSS). This is most likely due to local setup conditions and does not affect the accuracy of the system since it operates on a lose-in-weight basis. Do not attempt to zero the weight display - this will negate the calibration.



1. Display screen
2. Function keys
3. Enter key
4. Up arrow key
5. Right arrow key
6. Down arrow key
7. Left arrow key

Figure 6: The continuous feed rate controller.

Display screen

For ease of discussion, the display screen can be broken down into the following areas (see Figure 7):

- **Summary area** – displays one of four selectable values or a fault/alarm condition in large print, which allows the operator to check system performance at a glance. You can toggle through the selectable values by pressing the *MODE* function key. For more information on system fault/alarm conditions, see "Faults and alarms" on page 29.
  - *GROSS* – displays the gross weight of fiber currently in the drum.

Note

Even with a completely empty drum, the rate controller may not show zero gross weight; it should typically read within +/-2 lb of zero. Do not attempt to zero the weight display - this will negate the calibration.

  - *ACT* – displays the actual feed rate in units of weight/time. This is an averaged rate of change (ROC) and is the best indication of your current feed rate and system performance.
  - *TOTAL* – displays a running total of fiber by weight that has run through the Voyager. This reading is not resettable.
  - *AMT* – displays the amount of fiber by weight that has been processed through the Voyager since the last start. The counter runs from the time you press the **START** button until you press the **STOP** button.

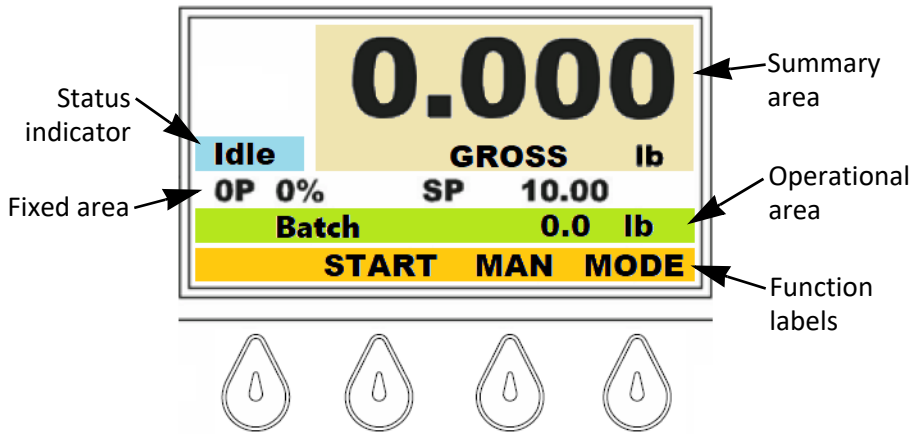


Figure 7: The rate controller's display screen.

- **Operational area** – displays one of six selectable values. You can toggle through the values by pressing the *Up arrow* and *Down arrow* keys (4 and 6, Figure 6 on page 18).
  - *Ingredient* – displays the current selected ingredient.

- *ROC* (Rate of Change) – displays the change rate in units of weight/time. ROC is the raw, unaveraged feed rate for visualization of your flow rate and is not the best indication of overall performance.
- *Total* – displays a running total of fiber by weight that has run through the Voyager. This reading is not resettable.
- *Batch* – displays the amount of fiber by weight that has been processed through the Voyager since the last start. The counter runs from the time you press the **START** button until you press the **STOP** button.
- *OP* (Output Percent) – displays the percentage of the available output signal that is currently driving the Voyager, provided in tenths (which gives a finer definition than the OP value shown in the fixed display area of the screen). An output greater than 100% will cause a *RATE CONTROL FAULT*.
- *GROSS* – displays the gross weight of fiber currently in the drum.

Note

Even with a completely empty drum, the rate controller may not show zero gross weight; it should typically read within +/-2 lb of zero. Do not attempt to zero the weight display - this will negate the calibration.

- **Function labels** – name of the functions currently assigned to each of the function keys. For more information on the various functions, refer to "Function keys" on page 20.
- **Status indicator** – indicates the current state of the system: ***Idle***, ***Auto***, ***Refill***
- **Fixed area** – displays the output percent (OP) rounded to a whole number, and the current setpoint (SP) for the rate of change. This portion of the screen can not be modified by the user.

Function keys

The functions associated with each of the four function keys (2, Figure 6) change depending on the current menu and the status of the system. The current function assigned to each key is indicated by the label above the key. The various functions are:

- *MODE* – enables the operator to toggle through the four values of the Summary display.
- *EXIT* – allows you to return to the previous menu.
- *CLR* – appears when you enter a menu. It clears the current value and repositions the cursor for the first entry. To avoid mistakes, you can clear the existing value before entering the new value.
- *START* – DO NOT USE – this function is superseded by the **START** button on the main control panel. If this button is pressed accidentally, press the *STOP* function key.

- *MAN* (Manual) – DO NOT USE – if this button is pressed accidentally, press it again so that *MAN* appears again, which indicates that the system is in *AUTO* mode.
- *HOLD* – DO NOT USE – this function is superseded by the **PAUSE** button on the main control panel.
- *STOP* – DO NOT USE – this function is superseded by the **STOP** button on the main control panel.

Set the feed rate

The controller's rate setpoint must be set to the desired feed rate for the current job. To change the rate setpoint, perform the following:

1. Press the *Enter* key to enter the Configuration menu.
2. Press the *Down arrow* key until the pointer is at 'Rate Setpoint'.
3. Press the *Enter* key. The Rate Setpoint sub-menu appears.
4. A flashing curser (see Figure 8) should be under the right-most digit. The flashing curser indicates that the digit is active and its value can be changed.

Note

Pressing the CLR function key while in the Rate Setpoint sub-menu will completely clear the existing setpoint. To avoid mistakes, you can clear the existing setpoint before entering the new setpoint.

5. Use the *Up arrow* and *Down arrow* keys to increase and decrease the value of the active digit.
6. Move the flashing curser from one digit to another by pressing the *Left arrow* and *Right arrow* keys.
7. Once all digits have been adjusted as desired, press the *Enter* key to save the setpoint. The controller will briefly display an "entry accepted" message to confirm that the new rate setpoint has been saved. Exit the configuration menu by pressing the *EXIT* function key.

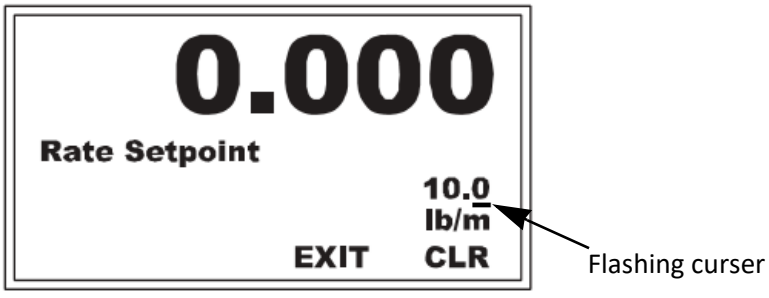


Figure 8: Setting the rate setpoint.

Faults/alarms

Fault conditions are shown on the summary area of the display, but fault handling is done by the fault display on the main control panel; see “Faults and alarms” on page 29.

Data storage

Continuous feed models are equipped with a Micro SD card for data storage. The card is located inside the main control panel in a drive on the PLC base module. The system records the following data every time the **STOP** button is pressed **OR** a fault occurs (in other words, every time that the system is stopped):

- date stamp
- time stamp
- duration of run
- amount of fiber dispensed during run (AMT)
- setpoint of run (SP)

Data is saved in a new ".csv" file each time.

To access the Micro SD card, use a small screwdriver to gently pull the SD card drive housing outward, toward you. This will allow you to access the SD card from the left side of the opened SD card drive, see Figure 9. A Micro SD card adapter is supplied with the system and can be found taped to the inside of the main control panel.

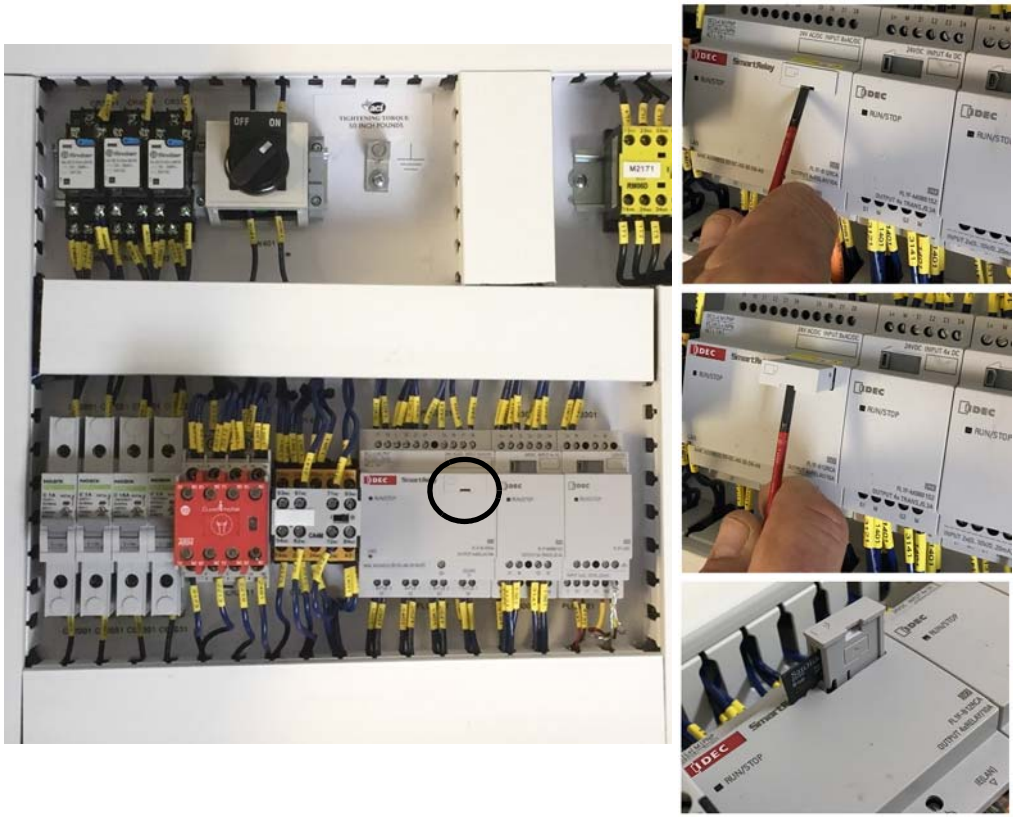


Figure 9: Location of Micro SD card inside main control panel.

Chapter 4

Operation

Prepare for operation

Before operating the Voyager dispenser, ensure the following:

- ☐ For mobile systems, ensure that the trailer has been set up and prepared according to the separately supplied "Quick Guide - Prepare Mobile System for Operation".
- ☐ For stationary systems, ensure that the system has been installed according to the separately supplied "Quick Guide - Installation for Fixed Operation".
- ☐ Ensure that the disconnect for the customer's power supply is turned ON.
- ☐ For mobile systems, ensure that the disconnect on the trailer's electrical disconnect enclosure is turned ON.
- ☐ Ensure that there are no foreign objects in the drum.
- ☐ Ensure that there is nothing binding any of the load cells, the drum or any other part of the Voyager. **Nothing** should be draped over any load cell or the drum - this includes hoses, wires, tubes, lose articles of clothing, etc.

Optimum performance

For optimum performance of the Voyager, the drum should be between 50% and 100% full throughout the duration of a dispensing job. This is due to the changing gravimetric pressure of the fibers in the drum as they are dispensed, and the effect that this has on the feed rate. As the amount of fiber in the drum decreases, the feed rate also decreases. This change is fairly linear until the drum is less than 60% full.

The **LOW FIBER** alarm will trip when the drum is approximately 55% full*. The system will continue to operate until the rate controller senses that the drum is about 25% full*, at which point it will automatically shut down the Voyager. To avoid shutdown and interruption of the job, it is imperative to add fiber to the drum as soon as the **LOW FIBER** alarm is tripped.

*Refer to Table 3 on page 9 for fiber-specific weight information for each of these set-points.

Prime the rake

Important

This procedure is only necessary after filling an empty drum or before a mobile system is operated for the first time after it has been moved with fibers in the drum.

As an **empty** drum is filled with fiber, or as a **non-empty** drum is transported (mobile system), fibers fall into the rake opening. This can cause the rake to bind when it is first turned on. It is necessary to remove those fibers before startup. This is done by priming the rake. Perform the following procedure.

Equipment needed

- Lock-out/tag-out equipment
- Flat head screw driver

Recommended procedure

1. Fill the drum with the fibers that will be used for the job.
2. Put system in *TEST* mode:
   a. Turn the disconnect switch on the main control panel to OFF.
   b. Lock-out the disconnect switch (see Figure 10).
   c. Use a screw driver to open the door of the main control panel.

Figure 10: Locking-out the disconnect on the main control panel.

   d. Remove the key that is taped to the floor of the box.
   e. Close the door and secure it closed with the screw driver.

f. Put key in the **RUN/TEST** key switch on the control panel and turn key to **TEST** position.

g. Remove the lock-out from the disconnect switch and turn the disconnect switch to ON.

h. Confirm that the display on the control panel indicates that the system is in Manual mode (see Figure 11).

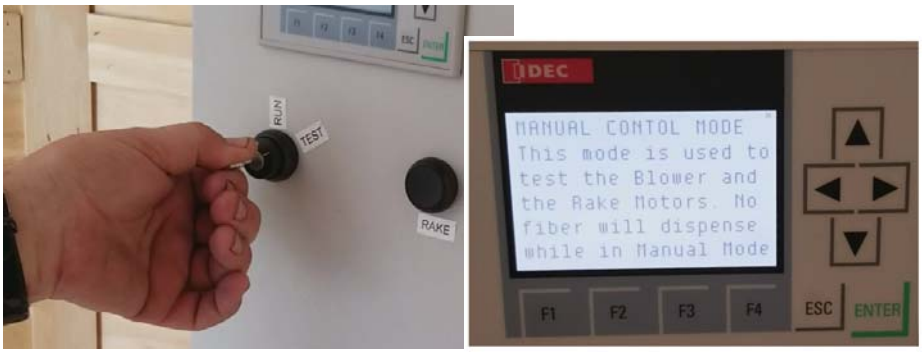


Figure 11: System in Manual control mode.

3. Press the **EMERGENCY STOP** button.
4. Manually rotate the rake coupler (see Figure 12) back and forth to dislodge fibers from the rake. The fibers will fall through the funnel and into the opening of the blower. Rotate the rake coupler until no more fibers fall.

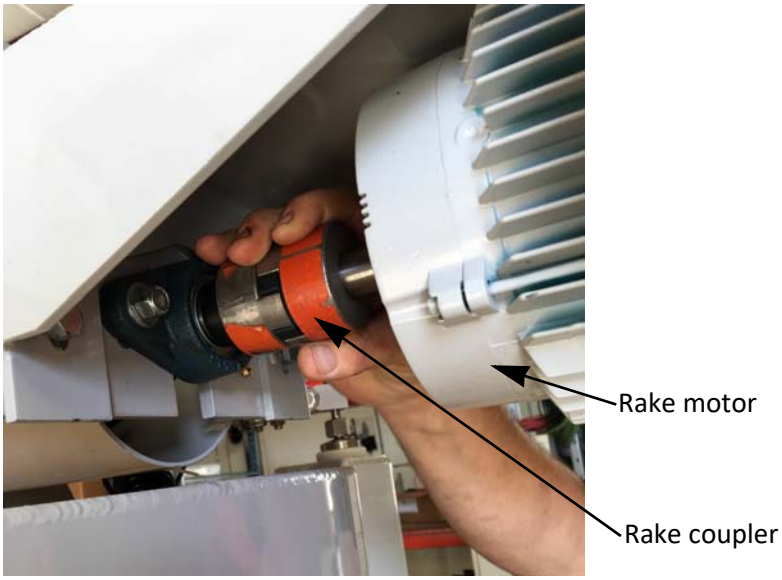


Figure 12: The rake coupler.

5. Release the **EMERGENCY STOP** button.

6. Press the **BLOWER** button to briefly run the blower and clear it of fibers.
7. Repeat steps3 through6 until the rake coupler spins freely by hand and no fibers fall from the rake. This means that the fibers have bridged over the opening above the rake and will no longer fall into the rake.
8. Put system in *RUN* mode:
   a. Turn the disconnect switch on the main control panel to OFF.
   b. Lock-out the disconnect switch (see Figure 10).
   c. Turn the key to **RUN** and remove it from the **RUN/TEST** key switch.
   d. Use screw driver to open the door of the main control panel and return the key to its position inside the control panel. Close the door and secure it closed.
   e. Remove the lock-out from the disconnect switch and turn the disconnect switch to ON.
   f. Confirm that the fault display on the main control panel no longer indicates that the system is in Manual mode.
9. The system is now ready to operate.

Running a continuous job

Following is the recommended procedure to feed fibers into a continuous asphalt process.

1. Fill the drum with the fibers that will be used for the job. If filling an empty drum or running the first job after the trailer was transported (mobile system), follow the procedure “Prime the rake” on page 26.
2. Make sure there is an appropriate supply of additional fibers on hand to complete the job.
3. Turn the disconnect on the main control panel to ON.
4. Check that the system status on the rate controller shows ***Idle***.
5. Check that the rate controller’s rate setpoint is set at the desired feed rate for the job. Change the feed rate if necessary; see “Set the feed rate” on page 21.
6. When you are ready to introduce fibers into the asphalt process, press the **START** button on the main control panel. The blower immediately turns on, and then 5 seconds later the drum and rake turn on to feed fibers to the blower. At this point the rate controller takes over control of the system.

Note

It is recommended that the Summary display be set to show GROSS, so that the current weight of fiber in the drum can be easily monitored during the job.

7. Add fibers to the drum as necessary throughout the job using the ***FILL*** mode; see “Filling the drum during a continuous job” on page 29.

Filling the drum during a continuous job

When it is necessary to add fiber to the drum while the Voyager dispenser is feeding fiber, you must put the system in ***FILL*** mode. When in ***FILL*** mode, the rate controller switches from running the system in rate control to running at a fixed speed and shows a status of ***Refill***.

CAUTION!

*Do NOT add fiber to the drum if the system is not in **FILL** mode - this will cause a RATE CONTROL FAULT which will shut down the system.*

1. Put the system in ***FILL*** mode by pressing the **FILL** button on the main control panel. Both the **FILL** and **STOP** buttons illuminate to indicate that the system is in ***FILL*** mode, also the status on the rate controller will switch to ***Refill***.
2. Add fibers to the drum until drum is full. Be careful not to inhibit rotation of the drum while adding fiber.

Note

*If the amount of fibers in the drum reaches maximum capacity while filling (see Table 3 on page 9), the system will automatically exit **FILL** mode and return to normal operation.*

3. Make sure that nothing is hanging on or draped over the drum.
4. If the *FILL* mode does not shut off automatically, take the system out of ***FILL*** mode by pressing the **FILL** button; the rate controller will switch back to running the system in rate control. Do not allow the system to remain in *FILL* mode for an excessive amount of time after completing the addition of fiber.

Faults and alarms

If the Voyager stops unexpectedly during a job, check the fault display screen on the main control panel for a fault condition. There are 6 fault conditions that will cause the Voyager to shutdown:

- E-STOP FAULT
- RATE CONTROL FAULT
- FUNNEL CLOGGED FAULT
- RAKE MOTOR FAULT
- BLOWER MOTOR FAULT
- DRUM MOTOR VFD FAULT

A fault condition will also cause the signal horn and strobe light to turn on. Refer to “Troubleshooting” on page 31 for more information on each fault.

During normal operation, the display should read *NO FAULTS*.

Operating tips

- If wind is an issue in situations where fiber is being output onto a belt, add a water injection system to mist the fibers after they are on the belt.
- During operation, periodically check the exit end of the discharge tube for buildup of fibers and other materials. Buildup can quickly lead to a blockage in the tubing which will lead to a fault/system shutdown. Remove all buildup.

Troubleshooting

In the event that problems arise during operation of the system, refer to Table 7 for help in determining the specific problem and its solution. If the problem cannot be determined through the chart, contact FORTA® Corporation as directed on page 7.

Table 7: Troubleshooting the system.

<table>
<tr><td>1</td><td colspan="2">Indication: The Voyager has shutdown and the fault display on the main control panel indicates an E-STOP FAULT.</td></tr>
<tr><td></td><td>Problem</td><td>Solution</td></tr>
<tr><td></td><td>The EMERGENCY STOP button has been pressed.</td><td>To clear the fault, resolve whatever issue caused the operator to press the EMERGENCY STOP button and then release the button by turning it clockwise as depicted by the arrows on the knob face; the button should then pop out.</td></tr>
<tr><td>2</td><td colspan="2">Indication: The Voyager has shutdown and the fault display on the main control panel indicates a RATE CONTROL FAULT.</td></tr>
<tr><td></td><td>Problem</td><td>Solution</td></tr>
<tr><td></td><td>The rate controller is unable to maintain the feed rate. This could be caused by:</td><td>To clear the fault, press the STOP button on the main control panel. Determine and correct the reason for the fault; check the following:</td></tr>
<tr><td></td><td>• The feed rate is set too high for the fiber being dispensed.</td><td>• Check the feed rate setting and make adjustments as necessary; see “Set the feed rate” on page 21.</td></tr>
<tr><td></td><td>• The fiber level in the drum is too low.</td><td>• Check the fiber level and add fiber as necessary.</td></tr>
<tr><td></td><td>• The weight of the drum can not be measured accurately.</td><td>• Check that there is nothing wedged between the floor and base/drum and that there are no foreign objects between the stand and base. Check that the load cells are adjusted to sufficient height so that the rake housing is not in contact the stand. Check that the discharge chute is not in contact with the funnel; an air gap must be maintained between them.</td></tr>
<tr><td></td><td>• Rake is bound.</td><td>• Prime the rake; see page 26. During the procedure, pay attention for the possibility of a foreign object lodged in the rake.</td></tr>
<tr><td></td><td>• A load cell or load cell cable is damaged.</td><td>• If none of the above correct the issue and the fault persists, there could be a damaged load cell or cable. Contact FORTA® Corporation as directed on page 7.</td></tr>
</table>

Table 7: Troubleshooting the system. (Continued)

<table>
<tr><td>3</td><td colspan="2">Indication: The Voyager has shutdown and the fault display on the main control panel indicates a RAKE MOTOR FAULT.</td></tr>
<tr><td></td><td>Problem</td><td>Solution</td></tr>
<tr><td></td><td>The circuit breaker for the rake motor has tripped due to the rake getting bound by fibers or foreign material. This can be caused by:
• The feed rate is set too high for the fiber being dispensed.
• The rake was not primed when needed.
• Fibers in the drum have absorbed moisture from the air.</td><td>• If the fibers have set overnight (or longer) in the drum, check them for moisture, otherwise continue to the next bullet. Certain fibers can absorb moisture from the air if they sit too long in the drum, this will cause them to swell and potentially clog the rake or discharge tubing. Moisture in the fibers can generally be detected by feel, or by squeezing a handful with a dry cloth. It may be necessary to remove all fibers from the drum and refill the drum with dry fibers.
• Prime the rake; see page 26. During the procedure, pay attention for the possibility of a foreign object lodged in the rake.
• Check the feed rate setting and make adjustments as necessary; see “Set the feed rate” on page 21.
Once any issues have been resolved, perform the procedure under “Rake motor or blower motor fault” on page 37.</td></tr>
</table>

Table 7: Troubleshooting the system. (Continued)

4	**Indication:** The Voyager has shutdown and the fault display on the main control panel displays a *BLOWER MOTOR FAULT*. The fault display could also indicate a *FUNNEL CLOGGED FAULT*.	
	Problem	**Solution**
	The circuit breaker for the blower motor has tripped due to the blower getting plugged with fibers or foreign material: • This is usually caused by blockage somewhere between the funnel and the exit point of the discharge tubing. • It can also be caused by the feed rate set too high for the fiber being dispensed.	It is very important to locate and clear all blockages. Do not force the Voyager to operate without clearing blockages - doing so will completely clog the blower which is very difficult to clear. • Check that there is a finger-size air gap between the discharge chute of the drum and the funnel of the blower. The gap should be all the way around the chute/funnel. Also, if there is fiber coming out of this gap, this indicates a definite blockage further down the tubing. • Check for blockage at the edges of the rake housing. • Check entire length of discharge tube, in particular the exit point, for fiber build up, and clear it. • If blockage is severe, clear the blower of any fiber buildup by performing steps 2, 6, and 8 of “Prime the rake” on page 26. To prevent future blockage: • Ensure that fiber is DRY. • Ensure that tubing is static-resistant tubing (see the separately supplied “Quick Guide - Prepare Mobile System for Operation” or “Quick Guide - Installation for Fixed Operation”). • Periodically clear any buildup on the exit point of the tubing. If the fault persists but the system appears to be functioning correctly, contact FORTA® Corporation as directed on page 7. Once any issues have been resolved, perform the procedure under “Rake motor or blower motor fault” on page 37.

Table 7: Troubleshooting the system. (Continued)

<table>
<tr><td>5</td><td colspan="2">Indication: The Voyager has shutdown and the fault display on the main control panel indicates a FUNNEL CLOGGED FAULT.</td></tr>
<tr><td></td><td>Problem</td><td>Solution</td></tr>
<tr><td></td><td>The through-beam sensor in the funnel has detected insufficient movement of fiber through the funnel:
• This is usually caused by blockage somewhere between the funnel and the exit point of the discharge tubing.
• It can also be caused by the feed rate set too high for the fiber being dispensed.</td><td>Refer to the solutions outlined under problem number 4 (BLOWER MOTOR FAULT).

If the indication was a FUNNEL CLOGGED FAULT only, then it is NOT necessary to perform the procedure under “Rake motor or blower motor fault” on page 37.</td></tr>
<tr><td>6</td><td colspan="2">Indication: The Voyager has shutdown and the fault display on the main control panel indicates a DRUM MOTOR VFD FAULT.</td></tr>
<tr><td></td><td>Problem</td><td>Solution</td></tr>
<tr><td></td><td>The system has been shut off suddenly or there has been a sudden change in voltage.</td><td>Perform the procedure under “Drum motor VFD fault” on page 39. If the fault persists, contact FORTA® Corporation as directed on page 7.</td></tr>
</table>

Chapter 5

Maintenance

Recommended maintenance schedule

The Voyager system will require very little maintenance or repair if the system is kept clean. The frequency of cleaning the system is very dependent on the conditions in which the system is used; the frequency for a system that is used in a fairly clean environment will be less often than that of a system used in a dirty environment. Refer to the recommended maintenance schedule in Table 8.

Table 8: Recommended maintenance schedule.

Frequency	Maintenance Item
Multiple times a day[1]	• Check the exit end of the discharge tubing for buildup. Remove all buildup.
Daily[1]	• Remove any loose fiber and other debris from the fan shroud of the rake motor, drum motor, and blower. • Remove any loose fiber and other debris from the drum's belt, bearings, and guides.
Dependent on duty cycle of the system[2]	• Inspect the drum belt; see page 36. • Lubricate the rake bearings; see page 36. • Inspect the rake coupler insert (spider); see page 37.

1. Frequency is very dependent on the conditions in which the system is used; the frequency for a system used in a fairly clean environment will be less often than a system used in a dirty environment. We recommend that you use the frequency listed as a starting point and then adjust as experience dictates.
2. If the system is used at a duty cycle of 75% (for example, system is operating a total of 6 hours out of every 8), the recommended frequency is every 2-4 weeks.
   If the system is used at a duty cycle between 75%-25%, the recommended frequency is monthly.
   If the system is used at a duty cycle less than 25%, the recommended frequency is biannually or twice per operating season, whichever is more frequent.

Inspect the drum belt

The drum belt should be inspected at the frequency stated in Table 8 on page 35. Inspect the teeth of the belt for wear and damage. Any wear or damage that causes the drum to slip during operation would require that the belt be replaced; contact FORTA® Corporation as directed on page 7.

Lubricate the rake bearings

The rake shaft is supported by two bearings - one on each end of the shaft. Both bearings should be lubricated at the frequency stated in Table 8 on page 35. Each bearing is equipped with a grease fitting (see Figure 13). Use a general purpose grease. Follow proper lock-out/tag-out procedures to lock-out the main control panel before performing maintenance.

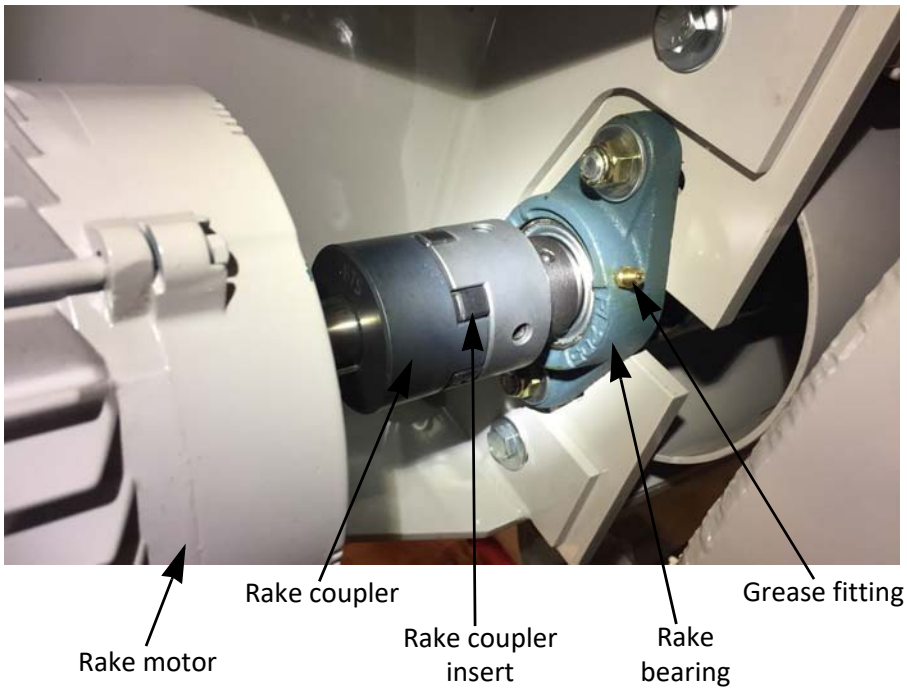


Figure 13: Components of the rake assembly.

Inspect the rake coupler insert (spider)

The rake coupler should be inspected for wear of the rake coupler insert at the frequency stated in Table 8 on page 35. Wear of the rake coupler insert would cause play or slop between the two halves of the coupler (see Figure 13). Ideally, there would be no play between the two halves of the coupler. If play is noticeable, the insert should be replaced, contact FORTA® Corporation as directed on page 7. A new insert can be purchased before a service visit; the proper part can be ordered from Lovejoy, Inc., part number 68514410968 (a Buna N spider for a #L095 3-jaw coupler).

Circuit protection

The system's electrical circuits are protected by various circuit breakers and fuses.

- There are three (3) 15 A mains fuses (see Figure 15 on page 38). These fuses should only require replacement if there has been a hard short to ground. In the unlikely event that one or more of the mains fuses have blown, the Voyager must be immediately taken out of service and disconnected from the 480V electrical supply. Do not replace these fuses without consulting with FORTA® Corporation; contact FORTA® Corporation as directed on page 7.
- Each motor in the system is protected from overload by a circuit breaker (see Figure 15 on page 38). If one or more of these circuit breakers is tripped during operation, the Voyager system is stopped and the fault display on the main control panel will indicate the appropriate fault(s). To reset the system when a motor fault occurs, perform the appropriate procedure below.

Reset system after a motor fault

Rake motor or blower motor fault

To reset the system after a ***RAKE MOTOR FAULT*** or a ***BLOWER MOTOR FAULT***, you must determine and correct any issues that caused the fault, and then reset the tripped overload circuit breaker. Perform the following procedure.

1. Use appropriate lock-out/tag-out procedures to lock-out the electrical supply mains for the system (for mobile systems this would be the electrical disconnect enclosure on the outside of the trailer, or for stationary systems this would be the facility's supply); see Figure 14.

Figure 14: Lock-out/tag-out of the electrical disconnect enclosure (mobile system).

2. Determine and correct any issues that caused the fault; refer to "Troubleshooting" on page 31.
3. Ensure that the mains supply for the system is still locked-out.
4. Open the main control panel and reset any overload circuit breakers that are tripped; see Figure 15.

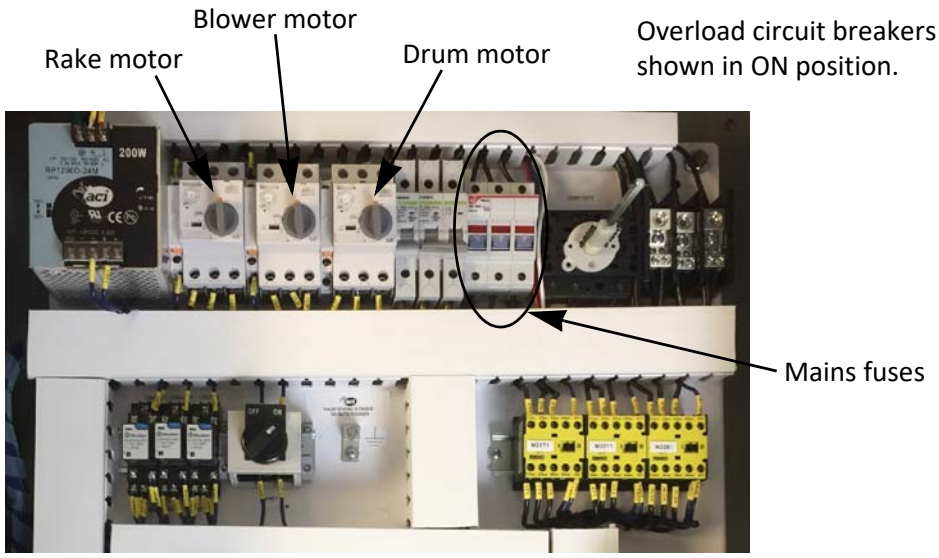


Figure 15: Overload circuit breakers and mains fuses inside the main control panel.

5. Close the main control panel.
6. Remove the lock-out from the system's electrical supply mains.
7. Restore power to the system and continue operation.

Drum motor VFD fault

To reset the system after a ***DRUM MOTOR VFD FAULT***, you must determine and correct any issues that caused the fault, and then reset the motor driver. Perform the following procedure.

1. Turn the disconnect switch on the main control panel to OFF for at least 2 seconds, and then turn the disconnect switch back ON.
2. The VFD unit will power up after a few seconds and will beep. The ***DRUM MOTOR VFD FAULT*** should clear from the display. If the fault did not clear from the display, repeat step 1. If the fault still does not clear go to the next step. If the fault clears, continue operation.
3. Use appropriate lock-out/tag-out procedures to lock-out the electrical supply mains for the system (for mobile systems this would be the electrical disconnect enclosure on the outside of the trailer, or for stationary systems this would be the facility's supply); see Figure 14.
4. Open the main control panel and check if the drum motor overload circuit breaker is tripped; see Figure 15. If the circuit breaker is tripped, reset it and continue with step 5. If the circuit breaker is not tripped, contact FORTA® Corporation as directed on page 7.
5. Close the main control panel.
6. Remove the lock-out from the system's electrical supply mains.
7. Restore power to the system and continue operation.
8. If the fault persists, contact FORTA® Corporation as directed on page 7.

Calibration

Traditional calibration of a weighing system uses certified test weights. Our electronic calibration allows the Voyager's weighing system to be calibrated without the need for test weights. The Voyager's weighing system consists of four load cells, a junction box, interconnect cables, and the rate controller. Each individual load cell's characteristics (sensitivity values) are measured on National Institute of Standards and Technology (NIST) traceable test devices and electronically recorded on an internal memory device when the load cell is manufactured. Each load cell's sensitivity value is accurate to five significant digits. The electronic calibration system uses these parameters, the load cells' characteristics and a reference point (0,0) to calibrate the weighing system.

On startup, the rate controller polls the load cell network and compares the load cell serial numbers to check if there were any hardware changes since the last calibration. If the system detects an issue with one or more of the load cells at any time, it will indicate a *RATE CONTROL FAULT*.