

Installation Instructions

Introduction

The FORTA Ranger is a volumetric fiber dispenser that efficiently and easily adds Mobile-Mesh™ fibers to a volumetric concrete process.

The Ranger must be installed on the volumetric concrete truck before use. The enclosed instructions provide good overall guidance on how to install the Ranger dispenser on your truck. Most truck manufacturers can provide more specific instructions or guidelines on how to install the Ranger dispenser on their truck bodies. Contact your truck's manufacturer.

These instructions outline the necessary steps to install the Ranger. 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.

The Ranger is available with two different lengths of discharge feed tube: 24 in long tube or 36 in long tube.

The Ranger is 24 in tall, from the bottom of the discharge feed tube to the top of the drum. If additional capacity is needed, an optional 16 in extension sleeve can be purchased. Contact FORTA Corporation for more information.



Important

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

For Use With



Operation and controls

For operation, the Ranger requires both an electric and a hydraulic power supply. Typically the truck's power supplies are used. In a similar fashion, the truck's control system can be used to control operation of the Ranger. When set up this way, the Ranger will run when the truck's belt is running. This works very well for normal operation, but can be inconvenient when it is necessary to calibrate the Ranger. To facilitate calibration, a two-way bypass or diverter valve should be installed between the Ranger and the hydraulic pump so that hydraulic flow can be isolated to the Ranger only. This valve must be purchased and installed by the customer.

If it is not desired to operate the Ranger via the truck's controls, an optional control kit can be purchased. The kit includes a control panel and all the necessary cables to connect to the Ranger and to a power source. The control panel has an on/off switch, potentiometer, and LED display.

Before you start

1. Identify supplied and optional items

Figure 1 shows items that are either included with the Ranger dispenser or are optional. Locate and identify them before you start. Also, refer to Table 1 below for component weights.

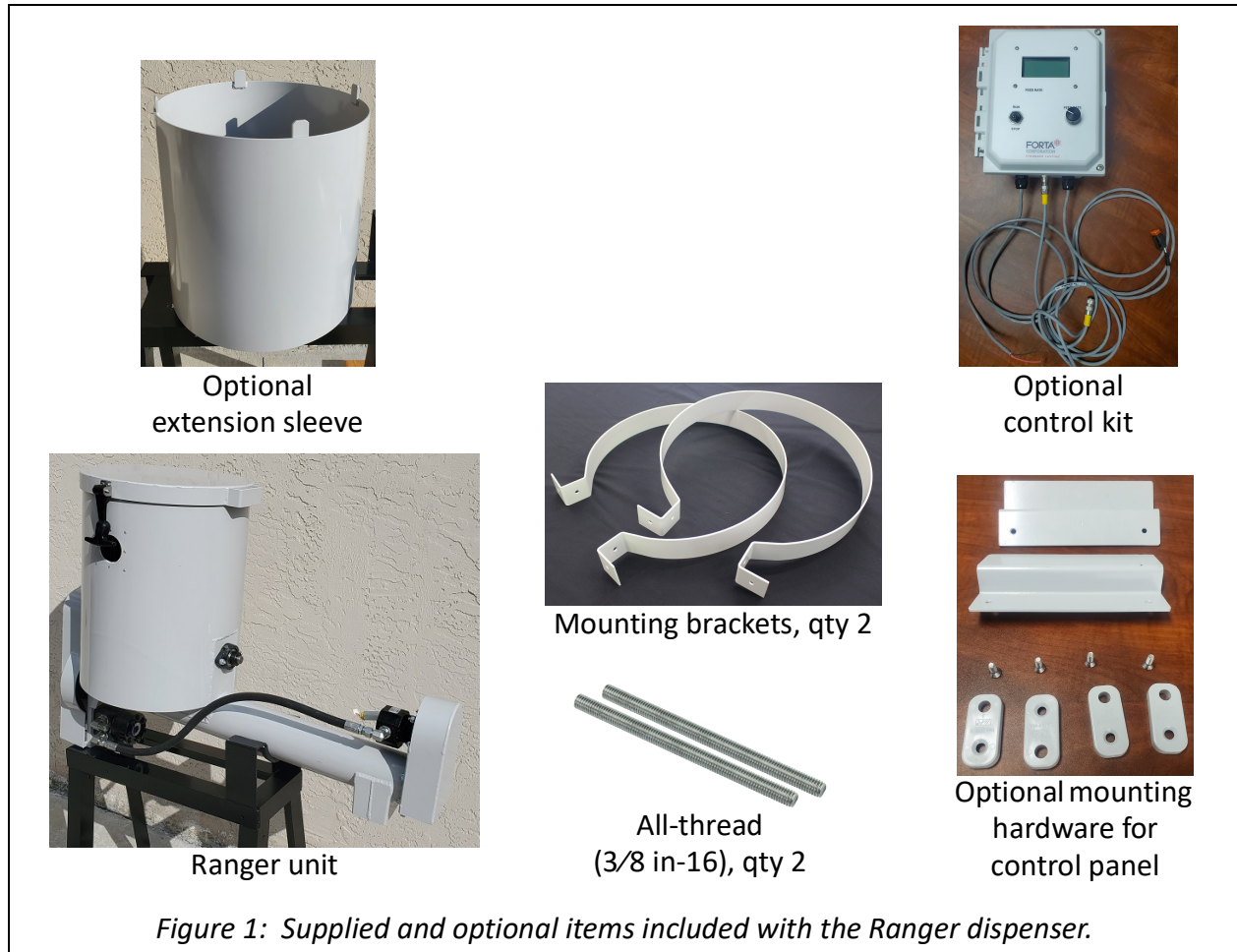


Table 1: Component weights (refer to Figure 1 above).

	Standard (26 in discharge tube)	Extended (35 in discharge tube)
Ranger unit ¹	66 lb	71 lb
Lid	3.5 lb	
Mounting brackets (2)	3.5 lb	
Optional control kit	5 lb	
Optional extension sleeve	9 lb	

1. Includes lid and all covers.

2. Utilities needed for operation

The following utilities are needed to operate the Ranger:

- A 12 VDC fused power source (2 Amp fuse)
- Truck's hydraulic power supply - Ranger requires an approximate oil flow of 1 gal/min

3. Tools and supplies required to install

You will need the following tools and supplies to install the Ranger:

- ☐ Drill, and both a 1/4 in and 5/16 in drill bit (for metal)
- ☐ Fasteners to install mounting brackets to Ranger (will use the supplied all-thread):
 - ☐ Four (4) 3/8 in **stainless steel** flat washers
 - ☐ Four (4) 3/8 in-16 **stainless steel** nylon-insert lock nuts
- ☐ Fasteners to install mounting brackets to truck:
 - ☐ Four (4) 3/8 in **stainless steel** fasteners, length sufficient for thickness of mounting surface, plus thickness of Ranger bracket (0.125 in), plus use of a flat washer on both sides, and **full engagement** of the threads of the nylon-insert lock nut
 - ☐ Eight (8) 3/8 in **stainless steel** flat washers
 - ☐ Four (4) 3/8 in **stainless steel** nylon-insert lock nuts
- ☐ Various wrenches and/or sockets (for the above listed fasteners)
- ☐ Three (3) hydraulic hoses, 3/8 in diameter or larger, #6 fittings, length sufficient to connect components as shown in ["Make connections"](#) on page 8
- ☐ If the optional control kit was purchased - fasteners, and potentially mounting hardware, to install the control panel to the truck (see ["Mount control panel of optional control kit \(if purchased\)"](#) on page 6)

4. Ranger dimensions and parts identification

It is important to be able to identify the correct parts of the Ranger as you read through these instructions. Refer to [Figure 2](#) below. Dimension of the Ranger are also provided, see [Figure 2](#) and [Table 2](#).

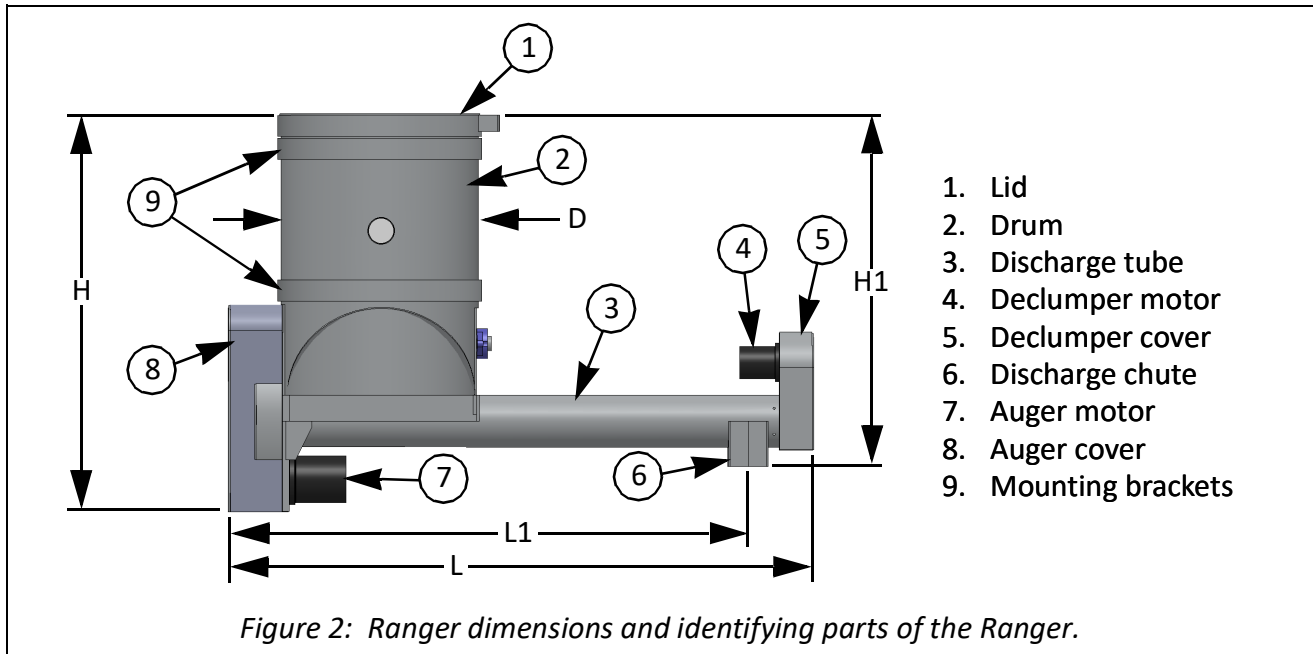


Table 2: Ranger Dimensions (refer to [Figure 2](#) above).

	Standard (26 in discharge tube)	Extended (35 in discharge tube)
Length (L), total	31.563 in	40.563 in
Length (L1), to center of discharge	26 in	35 in
Height (H), total	30 in	
Height (H1), to bottom of discharge	25.5 in	
Diameter (D)	15.5 in	

Mount the Ranger on the truck



Note

Two or more people are needed to perform this part of installation.

1. Locate the preferred mounting area

The Ranger must be mounted so that its discharge chute is above, and as close as possible to, the belt of the truck. See examples at right.

Your truck's manufacturer should be able to provide specific guidance on the best placement of the Ranger.

If it is not possible to mount the Ranger so that the end of the discharge chute is close to the belt, a length of 5 in diameter clear static-resistant tubing can be used to extend the chute. Mount and secure the tubing as necessary to the end of the discharge chute; see example at right.



Extending the discharge chute with 5 in clear tubing.

2. Prepare Ranger for mounting

Put mounting brackets on the drum of the Ranger. Position the brackets just below the lid and approximately in the middle of the drum (as seen in [Figure 2](#) and in the pictures of [step 1](#)). Make sure that the brackets do not interfere with the window in the drum and that they are in a good position to align with the mounting location on the truck. Secure the brackets to the Ranger with the all-thread and 3/8 in-16 washers and nylon-insert lock nuts.

3. Prepare truck for mounting

Hold the Ranger up to the truck at the desired mounting location and use it as a template to mark the positions of the holes needed to match the mounting brackets. Use the 11/32 in drill bit to drill holes at the marked locations.



Note

In some cases it may be necessary to add additional brackets or spacers to the truck to accommodate mounting the Ranger.

4. Lift and mount the Ranger

While one person lifts the Ranger into place and aligns it with the mounting holes, the other person secures the unit with the 3/8 in fasteners, washers and nylon-insert lock nuts. If it is necessary to rotate the Ranger so that the discharge chute aligns correctly with the belt, loosen the nuts of the all-thread just enough to rotate the unit, and then re-tighten the nuts when done. Also, a short piece of static-resistant tubing can be added to the end of the discharge chute if needed.

Mount control panel of optional control kit (if purchased)



Note

If you will use the truck's existing controls to operate the Ranger, skip this step and continue with "[Make connections](#)" on [page 8](#).

1. Locate the preferred mounting area

The control panel must be mounted so that an operator can easily see the display and reach the controls. Typically this would be near the truck's existing controls.



2. Install optional mounting hardware

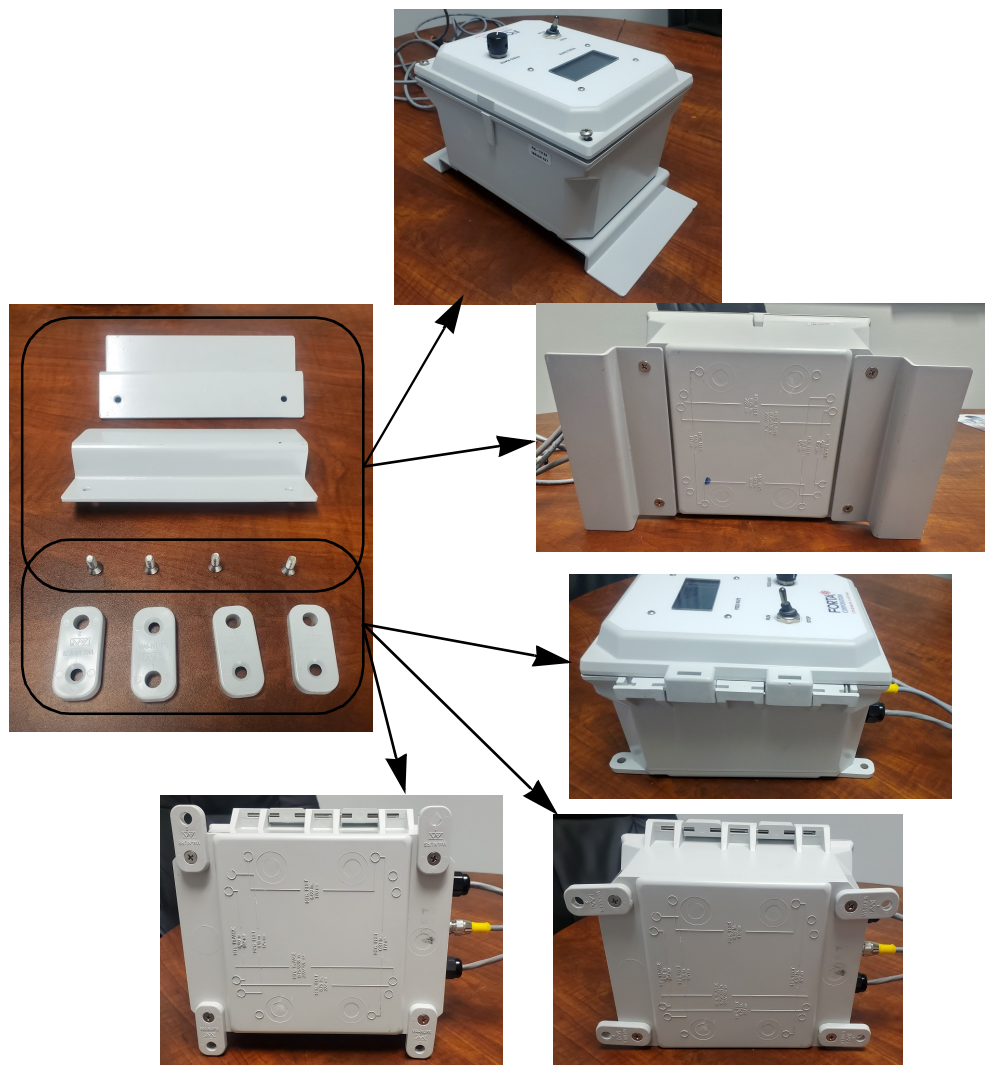


Note

If the optional mounting hardware was not supplied with your Ranger, the customer is responsible for supplying all mounting hardware to mount the control panel to the truck. The bottom of the box is equipped with a tapped hole in each corner that will accept #10-32 screws.

If the optional mounting hardware for the control panel was supplied, select which set of brackets work best for your needs - the full-size brackets or the smaller mounting feet (see images at right). Both sets of mounting hardware use the same screws (provided) to mount them to the bottom of the box.

Both options offer some flexibility in how the box can be mounted to the truck. Holes can be drilled as necessary in the outer flanges of the full-size mounting brackets, while the mounting feet can be positioned at multiple angles on the box (as shown in bottom two images at right) to accommodate mounting needs.



3. Mount control panel to truck

As necessary drill any holes in the truck and/or mounting brackets so that the control panel can be securely mounted to the truck. Any additional mounting hardware must be provided by the customer.

Make connections



CAUTION!

*Follow these instructions closely. The declumper motor can be damaged by back pressure at its return/outlet port. To prevent damage, a check valve has been installed on the return port of the declumper motor. Do not remove this check valve; removal of this check valve will void the warranty. Do not connect the return port of the declumper motor to any component that will create back pressure. Any damage caused by back pressure is not covered under warranty.

1. Make hydraulic connections

Connect hydraulic hoses between the components as shown in the schematic at right (blue lines). The hoses between the proportional control valve and auger motor, and between the auger motor and declumper motor are supplied and already connected (red lines).



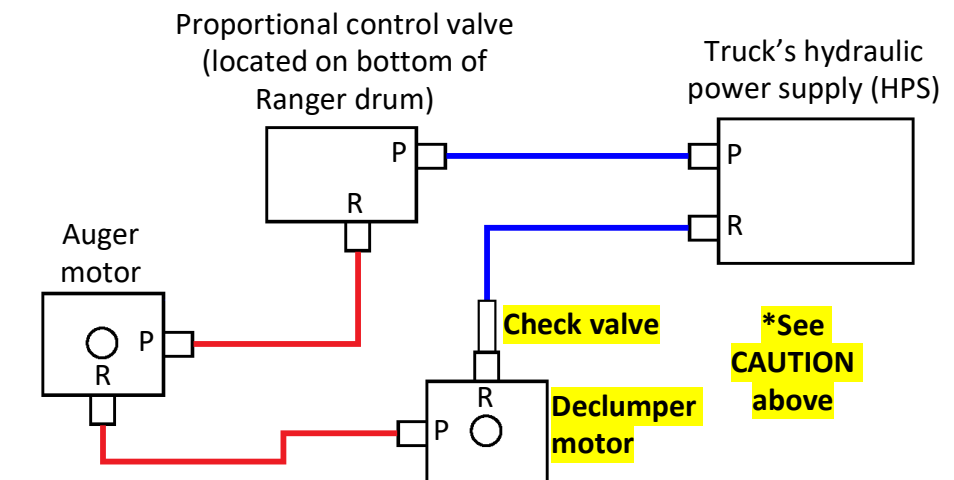
Important

Always make sure that hoses are connected to the correct port as tagged on the component. Hoses should always connect Return port of one component to Pressure port of the next component.

Schematic Legend

- Supplied with Ranger
- Supplied by customer

P = Pressure/inlet port
R = Return/outlet port



***See CAUTION above**

Connection for pressure hose from HPS

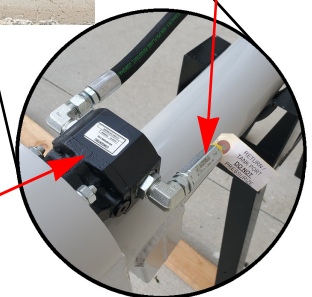
Check valve/ connection for return hose to HPS



Auger motor

Proportional control valve (on bottom of Ranger drum)

Declumper motor



2. Make electrical connections - using control kit



Note

If you will use the truck's existing controls to operate the Ranger, skip this step and continue with [step 3](#), "Make electrical connections - using truck's controls" on page 10.

Connect the **POWER** wire to the 12 VDC fused power source. If you want to connect the control panel into the truck's controls, contact FORTA Corporation, see "[Contact FORTA Corporation](#)" on page 11.

Remove the cap from the end of the speed sensor in the auger motor. Connect the **PROX SENSOR** cable from the control panel to the speed sensor. Match the connectors, plug in and then tighten the outer ring of the connector onto the speed sensor to make the connection secure.



CAUTION!

Do NOT loosen or try to adjust the speed sensor; damage can occur. If the sensor has come loose, contact FORTA Corporation, see "[Contact FORTA Corporation](#)" on page 11.

Connect the **MOTOR OUTPUT** cable from the control panel to the connection on the proportional control valve.



POWER wire

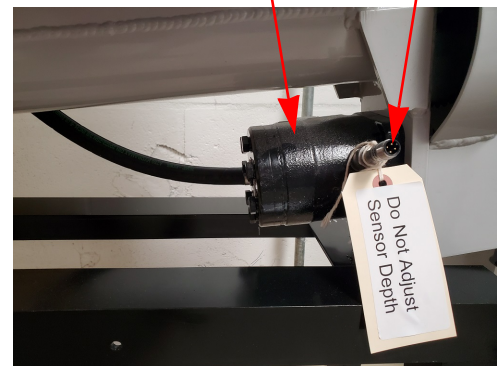
PROX SENSOR cable



MOTOR OUTPUT cable

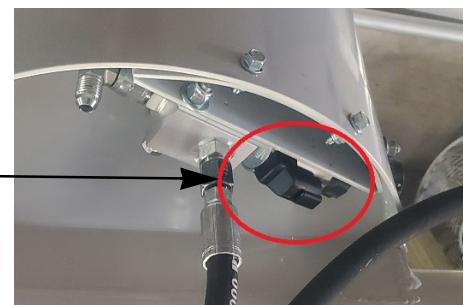
Auger motor

Speed sensor



Sensor cable connected

MOTOR OUTPUT cable connection on proportional control valve



3. Make electrical connections - using truck's controls



Note

If you will use the optional control kit to operate the Ranger, skip this step and make sure you have completed [step 2](#), "[Make electrical connections - using control kit](#)" on [page 9](#).

When using the truck's control system to operate the Ranger, it is only necessary to connect the supplied speed sensor cable between the auger motor and the truck's controls. For integration into the truck's controls, the wires in the cable are as follows:

- Brown - hot
- Blue - ground
- Black - signal

The speed sensor is set to deliver 36 counts/revolution. Relief valve for the auger motor should be set to 2500 psi.

Connect the sensor cable to the speed sensor. Remove the cap from the end of the speed sensor in the auger motor, match the connectors, plug in and then tighten the outer ring of the connector onto the speed sensor to make the connection secure.

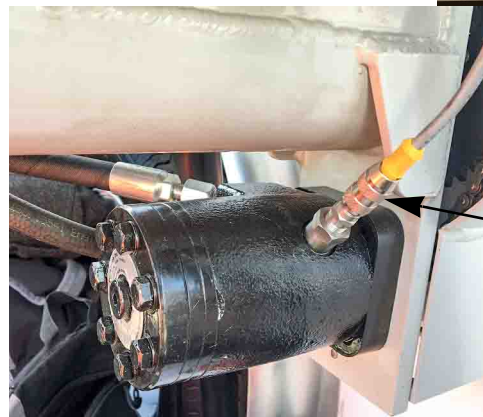
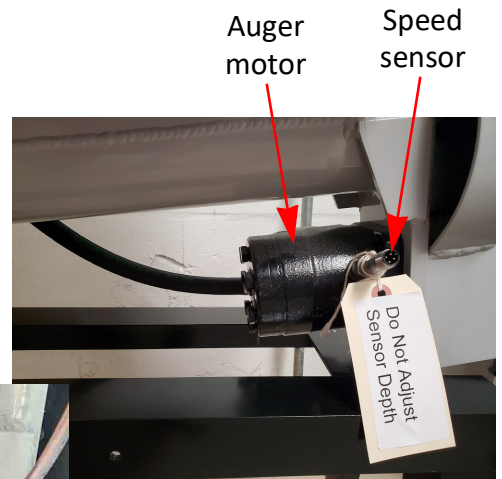


CAUTION!

Do NOT loosen or try to adjust the speed sensor; damage can occur. If the sensor has come loose, contact FORTA Corporation, see "[Contact FORTA Corporation](#)" on [page 11](#).



Sensor cable

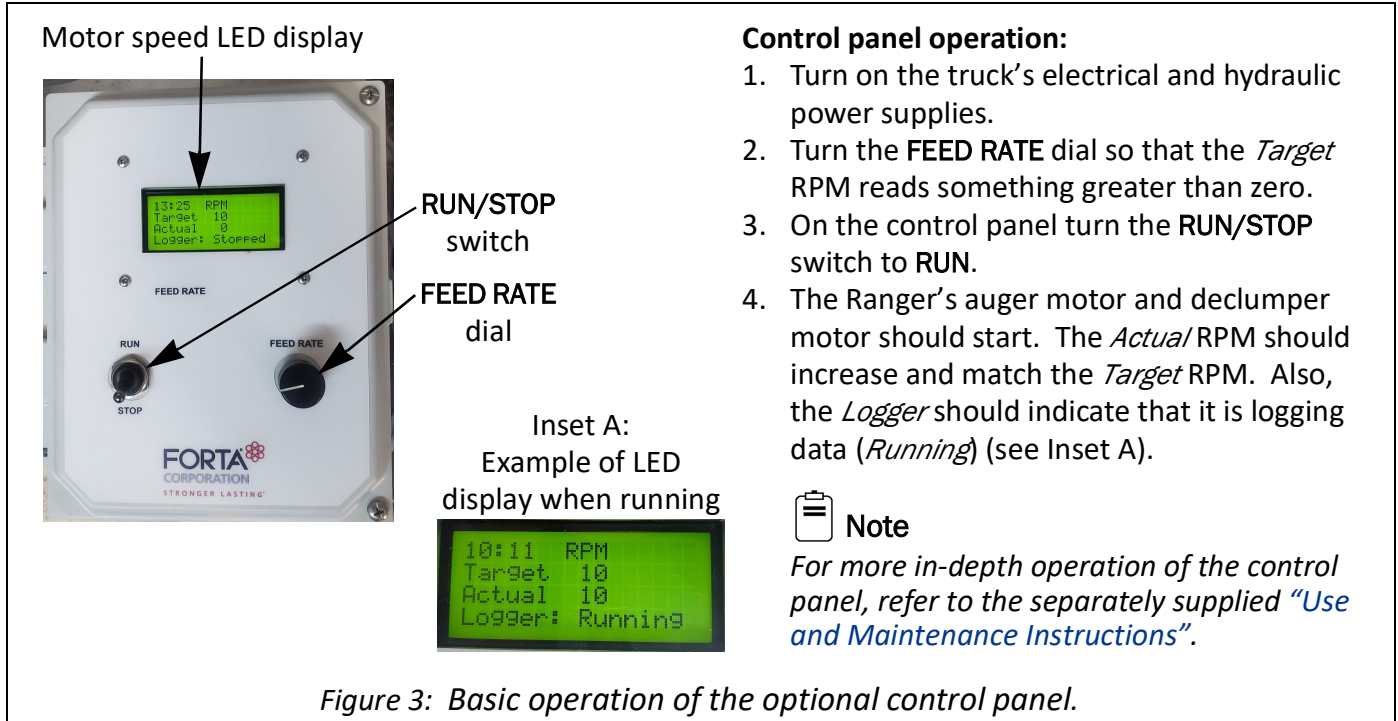


Sensor cable connected

Check operation

Turn ON the 12 Vdc power supply and the truck's hydraulic power supply. Operate the controls for the Ranger to turn it on (for operation of the optional control panel, see [Figure 3](#)).

If the auger motor and declumper motor do not start, check that the hydraulic lines are plumbed correctly.



Optional extension sleeve(s)

If an optional extension sleeve was purchased, it should only be installed onto the top of the drum during operation of the Ranger. Refer to the separately supplied "Use and Maintenance Instructions" for instructions on installing and removing the optional extension sleeve.



Note
Additional sleeves can be purchased and installed to extend the height and capacity of the Ranger. Contact FORTA Corporation for more information.

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

Use and Maintenance Instructions

Introduction

The FORTA Ranger is a volumetric fiber dispenser that efficiently and easily adds Mobile-Mesh™ fibers to a volumetric concrete process.

The Ranger must be properly installed on a volumetric concrete truck before it can be operated. If your Ranger is not already installed, refer to the separately supplied “[Installation Instructions](#)” for instructions on installing your Ranger.

These instructions outline the necessary steps to operate the Ranger volumetric fiber dispenser. 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.



Important

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



CAUTION!

The Ranger volumetric fiber dispenser is designed for use with Mobile-Mesh™ fibers only. The use of any other glass fiber, including E glass may harm or shorten the life of certain components. The use of any fiber other than Mobile-Mesh™ fiber will void any applicable warranty.

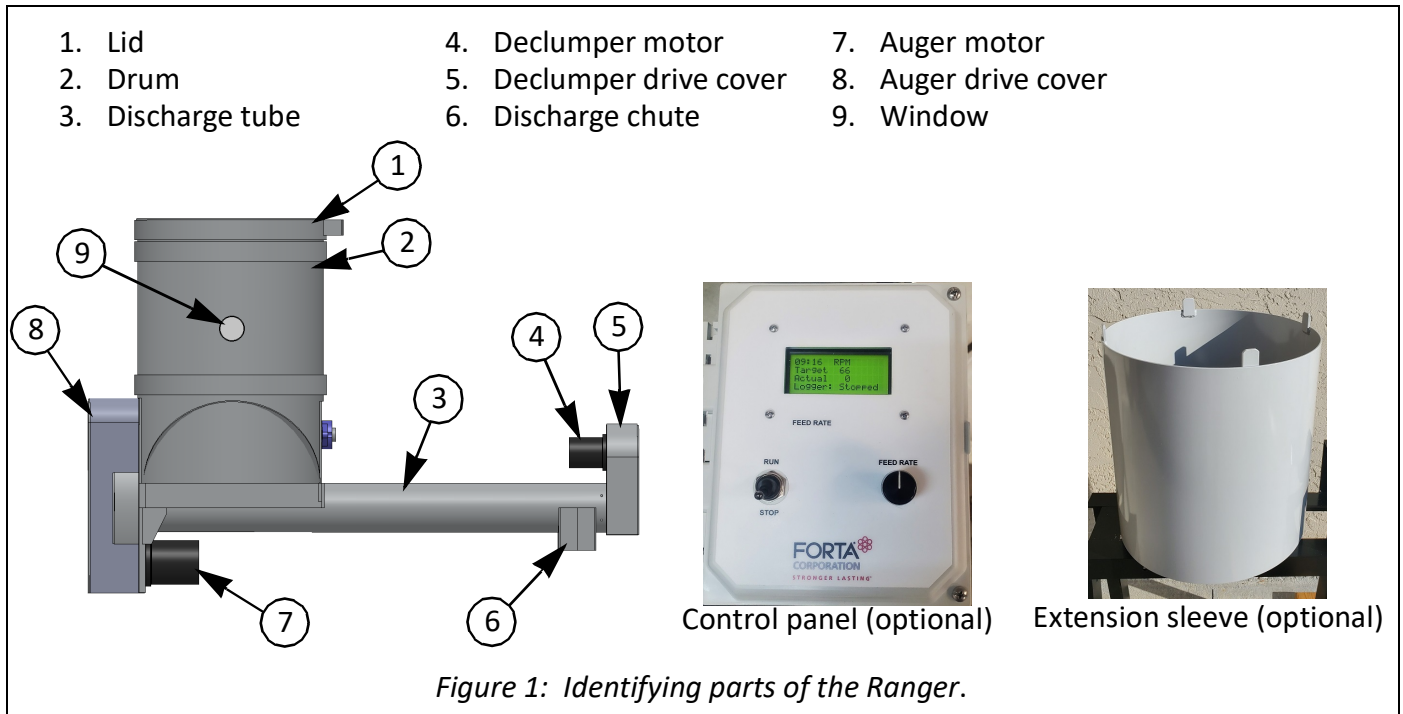
For Use With



FORTA[®]
MOBILE-MESH™

Identifying parts of the Ranger

It is important to be able to identify the correct parts of the Ranger as you read through these instructions. Refer to [Figure 1](#) below.



Optional extension sleeve(s)

When purchased, extension sleeves increase the capacity of the Ranger by extending the height of the Ranger. Each extension sleeve increases the drum's capacity by approximately 40 lb and its height by 16 in.

Extension sleeves should only be installed while the Ranger is in use. Each extension sleeve has 4 tabs that fit inside the top of the Ranger; extension sleeves are only held on by friction-fit. To install a sleeve, remove the lid of the Ranger and insert all 4 tabs inside the top of the drum. **All extension sleeves must be removed when the Ranger is not in use, particularly if the top of the extension sleeve is higher than any other part of the truck.** This is to prevent damage that could be caused during motion of the truck. Any damage caused by leaving an extension sleeve on the Ranger when the system is not in use is NOT covered under warranty.

Loading the Ranger

To load fiber into the Ranger, remove the lid from the drum and simply dump bags or boxes of Mobile-Mesh™ fiber into the drum. The drum can hold approximately 40 lb of Mobile-Mesh™ fiber. If extension sleeves have been installed, each extension sleeve increases the drum's capacity by approximately 40 lb (see "[Optional extension sleeve\(s\)](#)" above).

As fiber is dispensed, periodically add more fiber into the drum - particularly when the level of the fiber in the drum reaches the window on the side of the drum (9, [Figure 1](#)). When the level of the fiber in the drum reaches the window, more fiber should be added to the drum.

Ranger calibration

Factory calibration tests were performed on the Ranger for 1/2 in long fibers. Those tests provide a base-line feed rate of fiber from the dispenser at a given motor speed (RPM) and fiber length. The relationship between motor speed and fiber feed rate is linear.

The base-line feed rates derived from factory calibration tests can be put into the following simple equation (dependent on fiber length):

(Eq. 1) For 1/2 in fiber: $RPM = FR / 0.11$

Where: **RPM** = motor speed (RPM)
FR = feed rate (lb/min)

These equations can be used to give you a starting motor speed to attain a desired feed rate from your Ranger. We highly recommend that you run several calibration tests on your dispenser with your truck to confirm its actual yield for a given fiber length. Performing this calibration procedure at multiple motor speeds for a given fiber length will give you data to customize the appropriate equation above for your equipment. It is typically only necessary to perform this calibration once for a given motor speed and fiber length, but can be done as often as requirements dictate.

1. You will need:

- ☐ A 5 gallon bucket (or similar) to collect fibers
- ☐ A scale with capacity of 20 lb and accuracy of 0.1 lb (or better) to weigh the collected fibers
- ☐ A stopwatch or watch with a second hand

2. Fill the drum of the Ranger with fiber.

3. Weigh the empty bucket and record the weight, or if your scale has the ability to zero out the weight of the bucket, place the empty bucket on the scale and zero the scale.

4. Determine a specific length of time and motor speed/rate to run the dispenser for the calibration test (for example: run for 30 seconds at 60 RPM).

5. Turn on the Ranger and adjust the potentiometer to set it at the motor speed decided in [step 4](#).

6. Simultaneously start the stop watch and put the bucket under the discharge chute to collect fibers as they are dispensed. Once the predetermined amount of time has passed, turn off the Ranger and remove the bucket from under the discharge chute.

7. Weigh the bucket with fibers, calculate the weight of the fibers and record the weight. If the results are not the yield you were looking for, adjust the potentiometer and repeat steps 2 through 7. Adjust the potentiometer until you achieve your desired yield.

8. Repeat steps 2 through 7 several times at the same potentiometer setting to verify results. It is important to refill the drum each time.

9. Once the potentiometer setting is determined for a desired yield, record the motor speed and resultant fiber feed rate.

As desired, repeat the above calibration procedure for other feed rates. With the recorded data from multiple motor speed/feed rate tests, you can make adjustments to the appropriate equation above to customize it for your equipment.

Determine feed rate



Important

The equation provided in “[Ranger calibration](#)” on page 3 should be used as a starting point to help you pinpoint the necessary motor speed to produce a desired feed rate. We highly recommend that you run several calibration tests on your Ranger dispenser with your truck to confirm its actual yield; see “[Ranger calibration](#)” on page 3.



Important

Make sure that your truck has been calibrated so that you know its rate of discharge.

For **plastic shrinkage**, most concrete mix designs call for a dosage of 1 to 2 lb of 1/2 in Mobile-Mesh™ per cubic yard of concrete. For **repair or structural work**, mix designs may call for as much as 8 lb/cu yd or more. Once you have selected a dosage for your application, you must calibrate your dispenser with your truck to achieve the yield you require and determine the correct potentiometer setting for that dosage; see “[Ranger calibration](#)” on page 3.

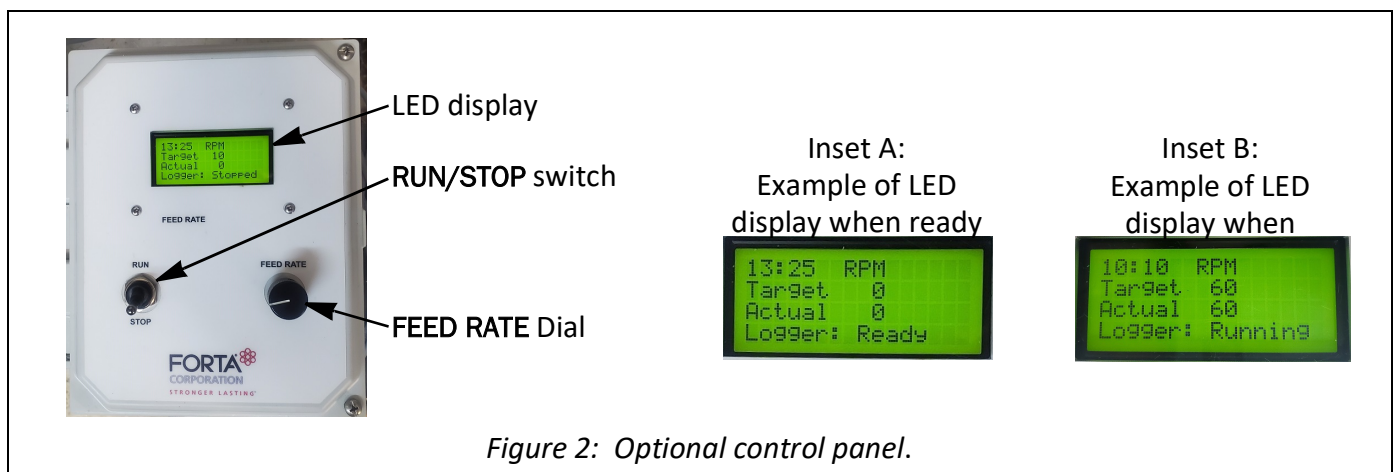
Optional control panel

The optional control panel ([Figure 2](#)) provides complete control of the Ranger with simple controls. When power is supplied to the control panel, the LED display will show a *Logger* status of:

- *Stopped* when the RUN/STOP switch is in STOP position - the Ranger is not operating and it's data logger is not recording data
- *Ready* when the RUN/STOP switch is in RUN position and the FEED RATE dial is set to zero - the Ranger is ready to operate (see Inset A of [Figure 2](#))
- *Running* when the RUN/STOP switch is in RUN position and the FEED RATE dial is set to a value greater than zero - the Ranger is operating to attain the set *Target* RPM (see Inset B of [Figure 2](#))

The recommended sequence of operation is as follows:

1. Adjust the FEED RATE dial so that the *Target* RPM is at the motor speed determined in “[Determine feed rate](#)” on page 4.
2. As the truck begins to operate, turn the control panel's RUN/STOP switch to RUN. The *Actual* RPM will increase and match the *Target* RPM (this can typically take 6-9 seconds). Also, the *Logger* will indicate that it is *Running* (recording data).



Data logging

The optional control panel is equipped with a micro SD card for data storage (see [Figure 3](#)). The card is located inside the control panel. The system records the following data to a “.csv” file, approximately once each second, while the RUN/STOP switch is set to RUN:

- Date (yyyy/mm/dd)
- Time (24 hour clock - HH:MM:SS)
- Target RPM
- Actual RPM

The name of the “.csv” file on the card is “FORTA.csv”. DO NOT remove or rename the file. The system is looking for this file when it records data. If it can not find the file, it will not record any data.

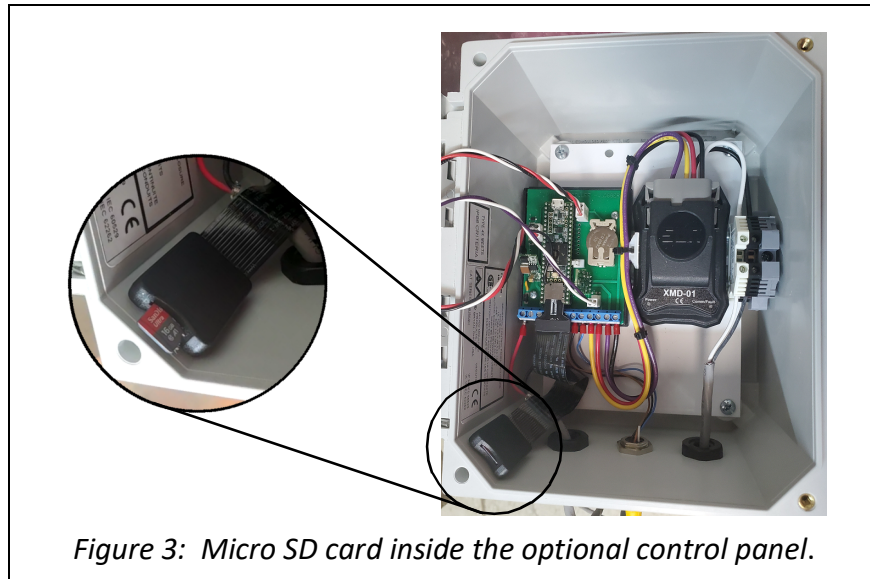


Figure 3: Micro SD card inside the optional control panel.

Accessing the micro SD card

To access the micro SD card:

1. The system should not be running, ensure that the RUN/STOP switch is set to STOP.
2. Open the door of the control panel.
3. Locate the micro SD card drive in the bottom left corner of the box as shown in [Figure 3](#).
4. Use a small screwdriver or your finger/finger nail to gently push in on the micro SD card and then release it, so that it ‘clicks’ and ejects itself from the housing. Carefully pull the card from the housing.
5. Insert the micro SD card into an adapter suitable for use with your computer (or card reader) and then insert the adapter into your computer. Locate the “FORTA.csv” file on the card and then **save a copy** of it onto your computer.



Important

Do not remove or rename the “.csv” file on the micro SD card. The system is looking specifically for this file when it records data. If it can not find the file, it will not record any data.

6. Once the file is copied, eject and remove the adapter from the computer and then the card from the adapter.

7. Reinstall the micro SD card into the housing in the control panel. Make sure the card is inserted properly, with the copper contacts facing the back of the housing (see inset of [Figure 3](#)). Gently push the card in until you feel a click.

Evaluating the data

Once the "FORTA.csv" file is on a computer, it can either be imported into an Excel spreadsheet or opened directly using Excel. The four "data columns" will actually be in one Excel column with each "data column" separated by the vertical bar symbol (|). These four "data columns" can be re-formatted so that each column of data is in its own Excel column, then the data can more easily be evaluated and manipulated to provide desired information.

When evaluating the data, you will see that it takes approximately 6 to 9 seconds for the PID loop to attain the target motor speed; this is normal.

With some simple calculations, you can use the data to determine the amount of fiber dispensed over a given amount of time or for an entire job.

Troubleshooting

Indications	Possible Problem	Solution
Declumper motor leaking oil	Blown seals at port P2 due to over-pressurization of oil (back pressure)	Either continue to operate with the leak, or replace the motor. Contact FORTA Corporation. To monitor oil pressure at port P2 of the declumper motor, install a tee connection with a pressure gauge at the port.

Maintenance

1. Daily visual inspection and maintenance

Before startup each operating day, perform a visual inspection of the Ranger:

- ☐ Ensure that the drum is full of fiber.
- ☐ Ensure that the inside and outside of the discharge chute is clean, in particular make sure that there is no build-up on the end of the chute.
- ☐ Remove auger and declumper drive covers; see "[Removing drive covers](#)" on [page 7](#). Ensure that the chains and gears of each drive are clean. Replace the drive covers.

The following maintenance should be done on a daily basis, during cleanup at the end of each operating day:

- ☐ Clean the inside and outside of the discharge chute, in particular be sure to remove any build-up of cement dust, etc.
- ☐ Clean the area around the auger and declumper motors.
- ☐ Remove auger and declumper drive covers; see "[Removing drive covers](#)" on [page 7](#). Clean and lubricate the chains and gears. Use a standard chain lubricant. Replace the drive covers.

2. Quarterly maintenance

The following should be done on a quarterly basis:

- ☐ Remove auger and declumper drive covers; see "[Removing drive covers](#)" on [page 7](#). Grease all bearings for each drive (3 for auger drive and 2 for declumper drive).

3. Annual maintenance

The following maintenance should be done on an annual basis, during the truck's annual servicing:

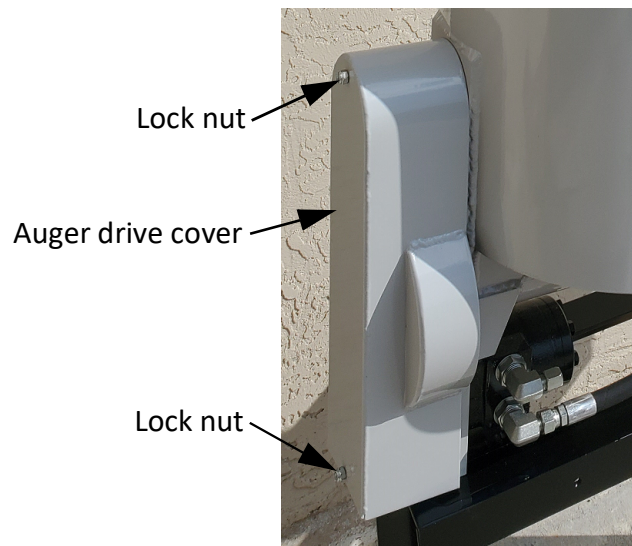
- ☐ Clean the inside and outside of the discharge chute, in particular be sure to remove any build-up of cement dust, etc.
- ☐ Clean the area around the auger and declumper motors.
- ☐ Clean and inspect all hoses for damage and leaks; replace hoses as necessary.
- ☐ Remove auger and declumper drive covers. Clean and inspect the chains and gears of both drives; replace as necessary. Apply standard chain lubricant to the chains and gears. Replace the drive covers.

Removing drive covers

When directed to do so for maintenance of the Ranger, perform the following to remove the auger drive cover and/or the declumper drive cover:

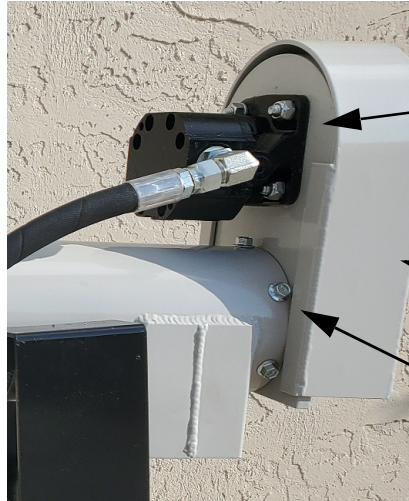
Remove the auger drive cover (8, [Figure 1](#)) by removing the two 1/4 in-20 lock nuts that secure it in place (see image at right).

To replace the auger drive cover, align the cover with the two mounting bolts and secure in place using the two 1/4 in-20 lock nuts.



Remove the declumper drive cover (5, [Figure 1](#)) by sliding it up off of its mounting block (see image at right).

To replace the declumper drive cover, slide it down over its mounting block by aligning the channel tabs with the mounting block.



Mounting block

Declumper drive cover

Channel tabs

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