

SeeSnake® *MAX*™ rM200



! WARNING!

Read this Operator's Manual carefully before using this tool. Failure to understand and follow the contents of this manual may result in electrical shock, fire and/or serious personal injury.

SeeSnake® *MAX*™ rM200

Record product serial number below as it appears on the nameplate.

Serial
No.

Table of Contents

Safety Symbols	3
General Safety Rules	3
Work Area Safety.....	3
Electrical Safety.....	3
Personal Safety.....	3
Equipment Use and Care.....	3
Service.....	4
Specific Safety Information	4
Description, Specifications, and Standard Equipment	5
rM200 Components	5
Pre-Operation Inspection	6
Electrical Checks.....	7
Operating Instructions	7
Overview.....	7
rM200 and CCU Placement.....	7
Connecting the rM200 to a CCU.....	8
Routing the Camera Head.....	8
Inspection Tips and Tricks.....	8
Using the rM200 CountPlus.....	9
Locating the Sonde.....	9
Line Tracing the Push Cable.....	10
Retrieving the Camera.....	10
Components and Assembly	10
Opening the rM200 Case.....	10
Replacing the rM200 Bearing Ring.....	11
Rewinding the Push Cable.....	11
Self-Leveling Camera.....	12
Removing the Camera Head.....	12
Installing the Camera Head.....	13
Directional Push Cable Drag Brake.....	14
Installing the Slip-Ring Assembly.....	14
Installing rM200 Pipe Guides.....	14
Installing rM200 Handles and Docks.....	15
Installing the Docking Handle.....	15
Installing the Stow Bin.....	17
Maintenance and Cleaning	18
Camera Maintenance.....	18
Push Cable Maintenance.....	19
Accessories	19
Transport and Storage	19
Service and Repair	19
Disposal	19
Troubleshooting Faulty Components	19
Troubleshooting	20
Notes	21

Safety Symbols

In this operator's manual and on the product, safety symbols and signal words are used to communicate important safety information. This section is provided to improve understanding of these signal words and symbols.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



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 information that relates to the protection of property.



This symbol means read the operator's manual carefully before using the equipment. The operator's manual contains important information on the safe and proper operation of the equipment.



This symbol means always wear safety glasses with side shields or goggles when handling or using this equipment to reduce the risk of eye injury.



This symbol indicates the risk of electrical shock.

General Safety Rules



Read all safety warnings and instructions. Failure to follow the warnings and instructions may result in electric shock, fire, and/or serious injury.

SAVE THESE INSTRUCTIONS!

Work Area Safety

- **Keep your work area clean and well lit.** Cluttered or dark areas invite accidents.
- **Do not operate equipment in explosive atmospheres, such as in the presence of flammable liquids, gases, or dust.** Equipment can create sparks which may ignite the dust or fumes.
- **Keep children and bystanders away while operating equipment.** Distractions can cause you to lose control.

Electrical Safety

- **Avoid body contact with earthed or grounded surfaces such as pipes, radiators, ranges, and refrigerators.** There is an increased risk of electrical shock if your body is earthed or grounded.
- **Do not expose equipment to rain or wet conditions.** Water entering equipment will increase the risk of electrical shock.
- **Do not abuse the cord.** Never use the cord for carrying, pulling, or unplugging the power tool. Keep cord away from heat, oil, sharp edges, and moving parts. Damaged or entangled cords increase the risk of electric shock.
- **If operating equipment in a damp location is unavoidable, use a ground fault circuit interrupter (GFCI) protected supply.** Use of a GFCI reduces the risk of electric shock.

- **Keep all electrical connections dry and off the ground.** Do not touch equipment or plugs with wet hands to reduce the risk of electrical shock.

Personal Safety

- **Stay alert, watch what you are doing, and use common sense when operating equipment.** Do not use equipment while you are tired or under the influence of drugs, alcohol, or medication. A moment of inattention while operating equipment may result in serious personal injury.
- **Use personal protective equipment.** Always wear eye protection. The appropriate use of protective equipment such as a dust mask, non-skid safety shoes, a hard hat, and hearing protection will reduce personal injuries.
- **Do not overreach.** Keep proper footing and balance at all times. This enables better control of the equipment in unexpected situations.
- **Dress properly.** Do not wear loose clothing or jewelry. Loose clothes, jewelry, and long hair can be caught in moving parts.

Equipment Use and Care

- **Do not force equipment.** Use the correct equipment for your application. The correct equipment will do the job better and safer at the rate for which it is designed.
- **Do not use equipment if the power switch does not turn it ON and OFF.** Any equipment that cannot be controlled with the power switch is dangerous and must be repaired.
- **Disconnect the plug from the power source and/or the battery pack from the equipment before making adjustments, changing accessories, or storing.** Preventive safety measures reduce the risk of injury.

- **Store idle equipment out of the reach of children and do not allow persons unfamiliar with the equipment or these instructions to operate the equipment.** Equipment can be dangerous in the hands of untrained users.
- **Maintain equipment.** Check for misalignment or binding of moving parts, missing parts, breakage of parts, and any other condition that may affect the equipment's operation. If damaged, have the equipment repaired before use. Many accidents are caused by poorly maintained equipment.
- **Use the equipment and accessories in accordance with these instructions; taking into account the working conditions and the work to be performed.** Use of the equipment for operations different from those intended could result in a hazardous situation.
- **Use only accessories that are recommended by the manufacturer for your equipment.** Accessories that may be suitable for one piece of equipment may become hazardous when used with other equipment.
- **Keep handles dry, clean, and free from oil and grease.** This allows for better control of the equipment.

Service

- **Have your equipment serviced by a qualified repair person using only identical replacement parts.** This will ensure that the safety of the equipment is maintained.

Specific Safety Information

WARNING

This section contains important safety information that is specific to the rM200. Read these precautions carefully before using the rM200 to reduce the risk of electrical shock, fire, or other serious personal injury.

SAVE ALL WARNINGS AND INSTRUCTIONS FOR FUTURE REFERENCE!

Keep this manual with the rM200 for use by the operator.

SeeSnake MAX rM200 Safety

- **Read and understand this operator's manual, the CCU's operator's manual, and the instructions for any other equipment in use before operating the SeeSnake rM200 System.** Failure to follow all instruction may result in property damage and/or serious personal injury.
- **Do not operate this equipment if operator or rM200 is standing in water.** Operating the rM200 while in water increases the risk of electrical shock.
- **The SeeSnake MAX system camera and push cable are waterproof.** The camera control unit (CCU) and other electrical equipment and connections are not waterproof. To decrease the risk of electrical shock, do not expose the equipment to water or rain.
- **Do not use where a danger of high voltage contact is present.** The equipment is not designed to provide high voltage protection and isolation.

- **Always use appropriate personal protective equipment when handling and using equipment in drains.** Drains may contain chemicals, bacteria, and other substances that may be toxic, infectious, cause burns or other issues. Appropriate personal protective equipment always includes safety glasses and may include drain cleaning gloves or mitts, latex or rubber gloves, face shields, goggles, protective clothing, respirators, and steel toed footwear.
- **If using drain cleaning equipment and drain inspection equipment at the same time, wear RIDGID drain cleaning gloves.** Never grasp the rotating drain cleaning cable with anything else, including other gloves or a rag which can become wrapped around the cable and cause hand injuries. Only wear latex or rubber gloves under RIDGID drain cleaner gloves. Do not use damaged drain cleaning gloves.
- **Practice good hygiene.** Use hot, soapy water to wash hands and other body parts exposed to drain contents after handling or using drain inspection equipment. To prevent contamination from toxic or infectious material, do not eat or smoke while operating or handling drain inspection equipment.

The information supplied with this product cannot cover all possible conditions and situations that may occur and should be used in conjunction with appropriate training, sound judgment, and good work practices. These factors cannot be built into the product, but must be supplied by the operator.

The EC Declaration of Conformity (890-011-320.10) will accompany this manual as a separate booklet when required.

Description, Specifications, and Standard Equipment

Description

The SeeSnake Max rM200 is the first camera reel in the SeeSnake Max Diagnostic System. SeeSnake Max Diagnostic Systems are designed for reliability, durability, and for delivering quality recordings and reports to your customers faster and more conveniently than ever before. With advanced reporting capabilities and superior in-pipe performance, the Max Diagnostic System gives you the best tools for any job.

The rM200 is equipped with a 60 m [200 ft] push cable that combines optimum stiffness with a friction-reducing outer jacket for maximum distance with less effort.

The newly designed self-leveling camera head can push through multiple turns in lines as small as 38 mm [1.5 in] and deliver clear images in lines up to 152 mm [6 in] in diameter.

The rM200 features a built-in sonde, integrated counter, and a system cable that can be connected to any SeeSnake Max or SeeSnake Original CCU.



Figure 1 – SeeSnake Max rM200

rM200 Components



Figure 2 – Front view

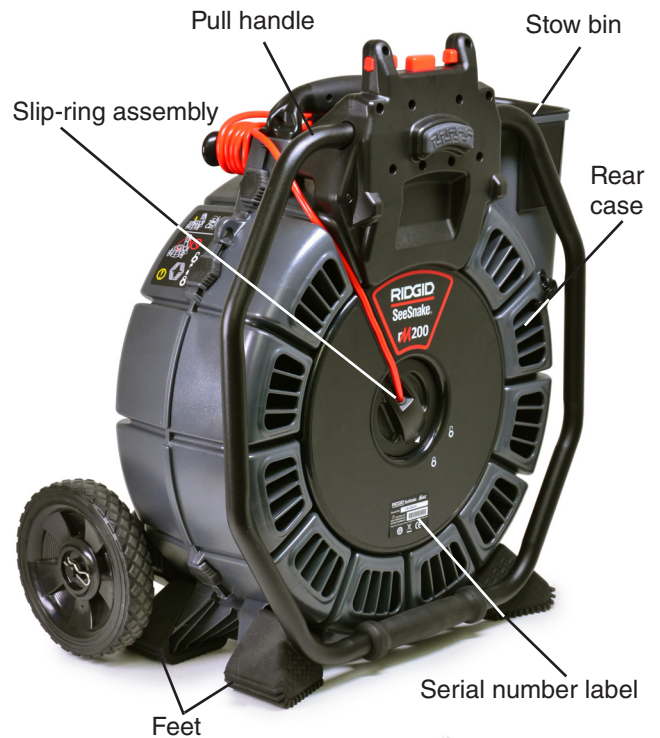


Figure 3 – Rear view

Specifications

Table 1 SeeSnake MAX rM200 Specifications	
Weight	15.5 kg [34.1 lb]
Dimensions:	
Length	527 mm [20.8 in]
Depth	349 mm [13.8 in]
Height	610 mm [24.0 in]
Drum diameter	432 mm [17.0 in]
Self-Leveling Camera specifications:	
Length	38.5 mm [1.47 in]
Diameter	25 mm [≥ 1.0 in]
Sonde	512 Hz
Lighting	6 high flux LEDs
Resolution:	
NTSC	648 × 488 pixels
PAL	768 × 576 pixels
Push cable:	
Length	61 m [200 ft]
Diameter	7.5 mm [0.3 in]
Bend radius	100 mm [≥ 4.0 in]
Pipe capacity	38 mm – 150 mm [1.5 in – 6.0 in]
Operating environment:	
Temperature [‡]	-40°C – 55°C [-40°F – 130°F]
Storage temperature	-40°C – 65°C [-40°F – 150°F]
Humidity	5% – 95% RH
Waterproof depth	69 m [225 ft]
‡ While the sensor will function in extreme temperatures, some image quality changes may be noticed.	

Standard Equipment rM200

- SeeSnake MAX rM200
- Operator's manual
- Instructional DVD
- Ball guides
- Camera head pipe guide
- Docking handle
- Self-leveling camera head
- Wheel and handle assembly
- Stow bin

Pre-Operation Inspection

⚠ WARNING



Before each use, inspect all equipment and correct any problems to reduce the risk of serious injury from electrical shock or other causes and to prevent damage to your equipment.

1. Turn the power off, disconnect external power cords, remove the battery, inspect all cords, cables, and connectors for damage or modification.
2. Clean any dirt, oil, or other contamination from the rM200 and other equipment to ease inspection and prevent the unit from slipping from your grip during transportation or use.
3. Inspect the rM200 for any broken, worn, missing, misaligned or binding parts, or any other condition which might prevent safe, normal operation.
4. Inspect all other equipment being used per its instructions to make sure it is in good, usable condition.
5. Correct any problems before use.

Work Area and Equipment Set Up

⚠ WARNING



Set up the rM200 and work area as described below to reduce the risk of injury from electrical shock, fire, and other causes and to prevent damage to the rM200.

1. Check work area for the following:
 - Adequate lighting.
 - Flammable liquids, vapors, or dust that may ignite. If present, do not work in area until sources have been identified and corrected. The rM200 is not explosion proof. Electrical connections can cause sparks.
 - Clear a level, stable dry place for operator. Do not use the machine while standing in water.
2. Inspect the work and determine the correct equipment for the task.
3. Ensure the equipment has been inspected as specified by the operator's manual.
4. Evaluate the work area and erect barriers as necessary to keep bystanders away. Bystanders can distract the operator during use. If working near traffic, erect cones or other barriers to alert drivers.

Electrical Checks

The rM200 will turn on when you turn on the CCU. The system may need to warm up before it will produce the optimum picture. When the CCU is warm, the system will produce a crisp picture free of noise and lines.

- Check to see that the LEDs on the camera head are producing an even amount of light.
- Test the slip-ring connection by placing the camera in the reel and spinning the drum while watching the CCU.

Operating Instructions

⚠ WARNING



Always wear eye protection against dirt and other foreign objects.

Wear appropriate protective equipment such as latex gloves, goggles, face shields, and respirators when inspecting drains that might contain hazardous chemicals or bacteria.

Do not operate equipment if you or machine is standing in water. Operating the machine while in water increases the risk of electrical shock. Rubber-soled, non-slip shoes can help prevent slipping and electric shock on wet surfaces.

This section includes information about:

- Overview
- rM200 and CCU Placement
- Connecting the rM200 to a CCU
- Routing the Camera Head
- Inspection Tips and Tricks
- Using the rM200 Internal Counter
- Locating the Sonde
- Line Tracing the Push Cable
- Retrieving the Camera

Overview

1. Ensure all equipment is properly set up according to the instructions in each unit's operator manual.
2. Connect the rM200 and CCU. Turn the CCU on.
3. Determine the cable access point depending on camera size and inspection location.
4. Pull several feet of push cable from the rM200. Ensure the camera window is clean. A slight film of detergent on the window can minimize debris sticking to the window.
5. Place the camera unit into the line without scraping the cable against the access point.
6. Grip the push cable and carefully feed it into the drain to be inspected. Use rubber gripper type gloves to manipulate the push cable, to improve grip, and to help keep hands clean.

rM200 and CCU Placement

Set the rM200 within arms length from the entry point to provide ample room to grasp and manipulate the push cable while viewing the CCU. Lay the rM200 on its back for stability and to prevent the rM200 from tipping during use.

- The location should not be wet. Do not allow the CCU battery to get wet during use.
- Do not allow excess cable to drag on the ground.



Figure 4 – rM200 positioned on it's back

When performing an inspection on a rooftop, on a hillside, or an inspection that requires an overhead entry, position the rM200 on its handle for greater stability (Figure 5).



Figure 5 – Positioning for rooftop inspections



Figure 7 – Routing the camera head

Connecting the rM200 to a CCU

To connect the rM200 to a SeeSnake CCU perform the following steps:

1. Unwrap the SeeSnake System Cable, pull back the locking sleeve, and match the System Cable plug to the matching SeeSnake System Connector on the CCU.
2. Join the connectors by aligning the cable ridge (Item 1) and guide pins (Item 2) to the guide socket and pushing the connector straight in (Figure 6).
3. Tighten the outer locking sleeve.

NOTICE Only twist the outer locking sleeve! To prevent damage to pins, never bend or twist the connector or cable.



Figure 6 – SeeSnake System Connector

Routing the Camera Head

Route the camera by reaching through the camera access opening and feeding the camera head through the push cable guide. Secure the camera head in the camera clip when not in use.

For best inspection results:

- Run water through the pipe during the inspection to help keep the camera system clean and to make pushing the push cable easier. This can be done by placing a hose down the line or turning on a fixture (for example: flushing a toilet). Shut off water flow as needed for viewing.

NOTICE Use of the rM200 camera in porcelain appliances may scratch the surface finish of the porcelain.

- Adjust the camera head LED lighting brightness and the display image by using either the keypad controller on the rM200 or by using the controller on the monitor of the CCU.

NOTICE Do not use camera head to clear obstructions!

Inspection Tips and Tricks

When pushing the cable into an inlet:

- Make sure there are no sharp edges that could cut, grab, or damage the push cable.
- Push short sections of the cable at a time to keep the cable from folding over itself. If the push cable folds over itself it has the potential of snapping or kinking.
- While pushing the cable, watch the CCU and turn up the brightness of the lights to see further down the line.
- The video footage is the most stable and clear when the camera is being pulled backwards. When you've found the inspection area of the pipe and you want better video footage, push the cable past the point of inspection and pull it back towards you.
- Be patient when using the self-leveling camera for the first time. The bearings and weight create a swinging effect when you push the push cable through the pipe. The camera image will level-out when the cable moves steadily through the pipe. At some point you may need to give the camera a jiggle so that the image levels out.
- For a better picture, you may need to rinse the camera head in standing water in the pipe.

- At changes in direction such as P-traps, Tees, Ys, and elbows, use a quick push to “pop” the camera around the bend. Create the “pop” by pulling the camera head back from the bend approximately 200 mm [8 in] and quickly thrusting it through the bend. Do not use more force than necessary.
- Obstructions or excessive build up in the line could damage or prevent retrieval of the camera head.

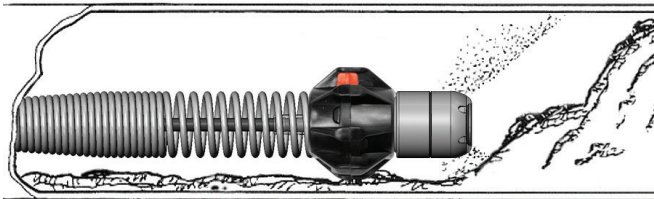


Figure 8 – Encountering an obstruction

Using the rM200 CountPlus

All SeeSnake Max reels and many original SeeSnake reels come equipped with a cable-measurement system. The rM200 has an integrated distance-counter that can track the total length of the extended push cable. The distance counter can also measure distance from a temporary zero-point, such as a pipe head or joint, that is selected during the inspection.

During an inspection, you can burn text onto your video with the Text Key on the rM200 counter keypad. Use the arrows to toggle between lines and letters. Enter text such as an address, contact information, or employer. When the text is displayed on the screen and if you begin recording, the text will appear in the video. As soon as you select the Text Key again, the overlay will disappear.

Counter Keypad

The integrated counter can be controlled either with its keypad or with a compatible CCU.

Table 2 Integrated Counter Keypad Legend		
Key		Meaning
	Menu/Back Key	Opens the Main Menu and navigates to your last window.
	Zero/Select Key	Selects a highlighted menu item and initializes the local zero-point counter. Press and hold this key for 5 seconds to perform a hard reset.
	Sonde Key	Toggles the Sonde ON or OFF.
	LCD Brightness Key	Controls the brightness of the LEDs in the camera.

Table 2 Integrated Counter Keypad Legend		
Key		Meaning
	Up Arrow/Edit Key	When slide text is displayed, the up arrow navigates directly to the editing page for existing slides. Moves through menu choices or text characters.
	Left/Right Arrow Keys	Move through available slides to new slide if text is being displayed. Moves through menu choices and text characters.
	Down Arrow Key	Moves through menu choices, values and text characters in edit mode.
	Text Key	Text Overlay allows you to write a text title or description for display on any segment of the captured video.
	Date/Time Key	Date/Time provides alternatives in displaying the date, time, or both.
	Distance Key	Distance the camera has traveled in the line or from any selected point in the line.

Getting Consistent Measurements

To get consistent measurements keep the following in mind:

1. Place the camera head into the camera clip before powering the system on.
2. Wait for the initialization screen on the CCU to disappear before moving the camera head.
3. At the entrance to the line press and hold the Zero Key for about 5 seconds to set an absolute zero.

NOTICE Avoid moving the reel once you have started your measurements.

Setting a local zero point gives you a measurement of the distance between two points in a line.

1. Press the Zero Key briefly to temporarily set the distance measurement to zero. The numbers will appear inside brackets when displaying a “local zero” distance measurement.
2. To clear the “local zero” and return to the system count, briefly press the Zero Key again.

Locating the Sonde

All SeeSnake Max pipe inspection systems have a sonde built into the camera. The sonde transmits a locatable 512 Hz signal that can be detected by a receiver. Receivers such as the RIDGID-SeekTech SR-20, SR-60, Scout™ or NaviTrack® II set to 512 Hz can detect the sonde’s location underground.

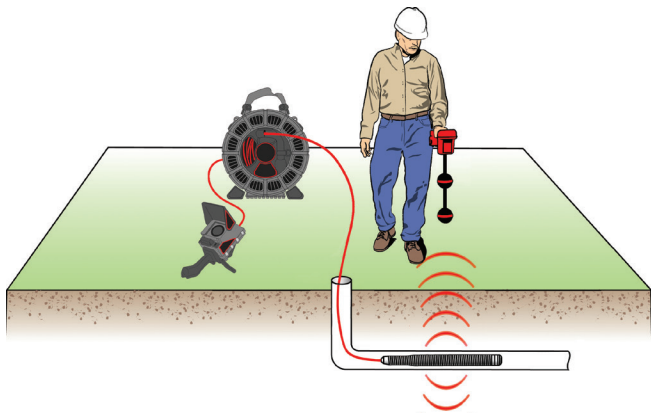


Figure 9 – Locating the rM200 sonde

Turn the Sonde on and off by using the Sonde Key on the rM200 keypad or on the SeeSnake CCU. When the Sonde is on, the rM200 LED keypad will be lit and faint noise lines will be visible on the monitor of the CCU.

To locate the activated sonde follow these instructions:

1. Run the SeeSnake push cable from 1.5 m to 3 m [5 ft to 10 ft] into the pipe.
2. Turn the receiver on and set it to sonde mode.
3. Scan in the direction of the sonde's probable location until the receiver detects the sonde.

For additional instructions on sonde locating, consult the operator's manual for the receiver model you are using.

Line Tracing the Push Cable

You can trace the path of the push cable underground with a receiver by transmitting a current onto the push cable.

Set up the transmitter by clipping one connector to the grounding stake and clipping the other connector to the Transmitter Clip-on Terminal on the CCU. For best results, use higher frequencies.

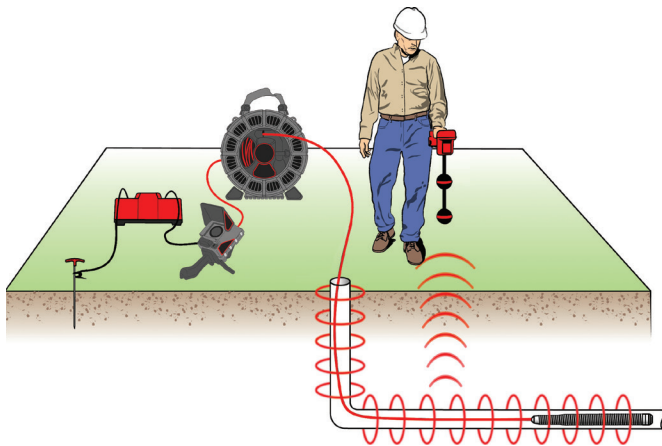


Figure 10 – Line tracing the Push Cable

For additional instructions on line tracing, consult the operator's manual for the transmitter model or watch the Integrated Line Trace video posted online. To see the video go to www.ridgid.com/Tools/Utility-Locating-Training/EN/index.htm.

Retrieving the Camera

After completing the inspection, pull the push cable back with slow, steady force. If possible, continue running water down the line to help clean the push cable. Use a towel to wipe off the push cable as you withdraw it and feed it back into the drum.

Pay attention to the force required to withdraw the push cable and always keep lead hand close to the access point. Keep clear of any sharp edges and do not pull at sharp angles at the inlet.

To avoid damaging the camera or push cable, do not force the push cable or exert excessive force during retrieval. If the camera head is stuck behind a turn, pop it back through or run water down the pipe.

NOTICE Always use short strokes to feed small lengths of the push cable back into the drum (Figure 11). Lay the rM200 drum on its back for more stability when retrieving the push cable.

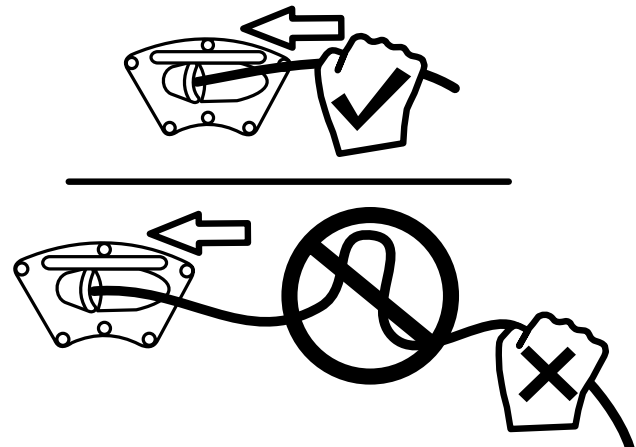


Figure 11 – Rewinding the Push Cable

Components and Assembly

⚠ WARNING

To reduce the risk of serious injury, follow these procedures for proper assembly.

Opening the rM200 Case

NOTICE Do not open the case while the camera head is stored in the camera clip.

Make sure the camera head is in the rM200 reel drum before unlatching and opening the case. If the camera head is not in the drum, the push cable can unspool and cause

serious injury.

1. Push camera head through camera access opening and secure it inside the reel drum (Figure 12).
2. Unwrap system cable from cord wrap.
3. Slide all (6) case latches upward, unlocking front and rear of the rM200 case.
4. Lift handle to open case.

With the rM200 case open, remove the drum to either replace with another drum or for cleaning and maintenance.



Figure 12 – Route camera head through camera access opening.

Replacing the rM200 Bearing Ring

NOTICE Do not use the rM200 without the bearing ring installed. If the bearing ring is missing, the push cable could damage or break.

1. Lift drum out of the case and turn over, so the keypad is faced down.
2. Replace old bearing ring with the new bearing ring. Make sure the ball bearing side is facing up.



Figure 13 – Replace old bearing ring with new bearing ring.

Rewinding the Push Cable

NOTICE Always store the camera completely inside the drum or in the camera clip.

The push cable can unwind if the camera head is loose and the drum is not in the rM200 case. If the drum is not in the case, do not manually twist or force the push cable back into the drum. Because the drum cannot spin freely, the push cable can bend and kink.

If the push cable has unwound from the drum:

1. Place the drum back into the case (Figure 14).



Figure 14 – Drum properly seated in case

2. Straighten out the push cable so that it is not twisted. If the push cable cannot be completely straightened, make sure the push cable does not bend or get caught on any objects in its path.
3. Use both hands to slowly guide the push cable into the drum (Figure 15). Take care to push smoothly to prevent kinking the cable.



Figure 15 – Guiding the push cable into the drum

4. Once the cable is completely seated inside the drum, guide the camera head through the push cable guide.
5. Secure the camera head in the camera clip.
6. Lock all six of the case latches.

Self-Leveling Camera

The self-leveling camera featured on the rM200, may produce an unfamiliar image. Be patient when using the camera for the first time. The bearings and weight create a swinging effect as the cable is pushed through the pipe.

The camera will level out when the push cable stops moving. Depending on the orientation of the camera and push cable in the pipe it may be necessary to jiggle the push cable to level the camera.

Read the following instructions to install the self-leveling camera head, to troubleshoot image problems, or to perform maintenance and cleaning.

Removing the Camera Head



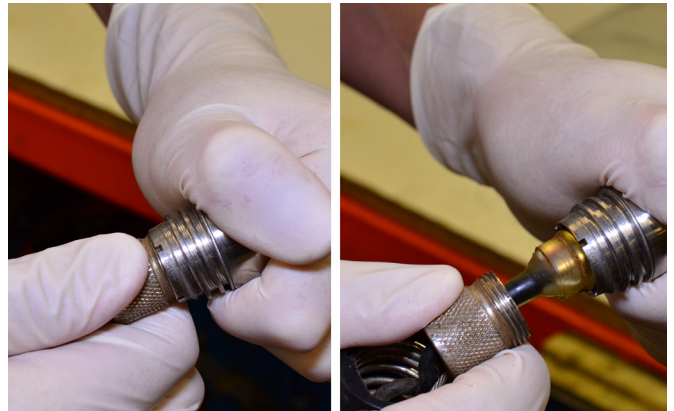
1. Snap the included plastic spanner wrench onto the spring, behind the camera head.



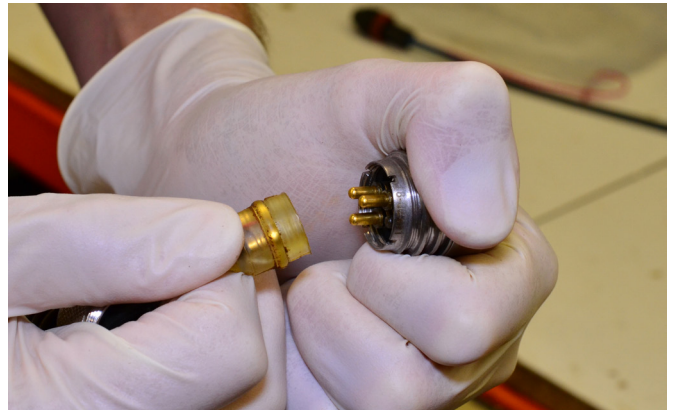
2. Align the notch inside the wrench with the end of the spring coil.



3. Unscrew the spring from the camera head.



4. Unscrew the locking sleeve from the camera.



5. Pull the camera head straight out.

NOTICE To avoid damaging the camera's connector pins, do not bend or twist while pulling the camera head off the connector.

Installing the Camera Head



1. Insert the connectors.



2. Slide push cable locking sleeve into camera head.



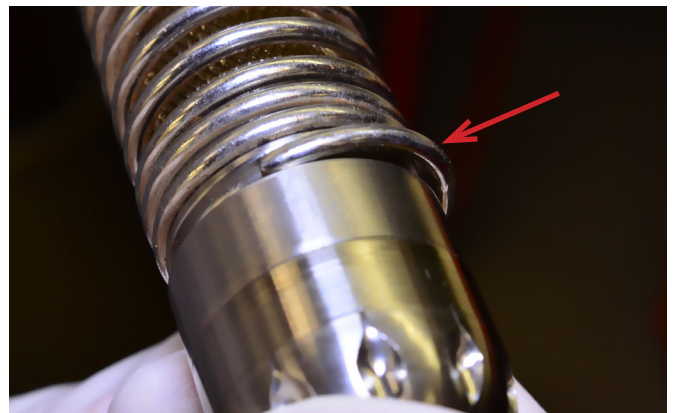
3. Hold the camera head and screw the locking sleeve back into the camera head.



4. Rotate the camera head one turn counterclockwise and then thread it onto the spring to counteract the twisting that will occur when twisting.



5. Thread the spring onto the camera head until the end of the spring is flush against the camera head.



6. Do not over tighten the spring!

To clean the camera head, refer to the Maintenance and Cleaning section of this manual.

Directional Push Cable Drag Brake

The rM200 has a directional drag brake that prevents the push cable from self-deploying and allows you to rewind the push cable with ease.

The directional drag brake automatically increases drag when the push cable is pulled from the reel and decreases drag when the push cable is returned to the reel. The directional drag brake uses a unique series of ball bearings, ratchets, and ramps to increase or decrease drag on the push cable.

Installing the Slip-Ring Assembly

NOTICE Do not touch the contact pins inside the slip-ring assembly. Stressing the contact pins can cause them to break.

The removable slip-ring assembly has contact pins that are recessed so that under normal use, they will not break. Avoid pressing sideways on the contact pins as this can cause them to break.

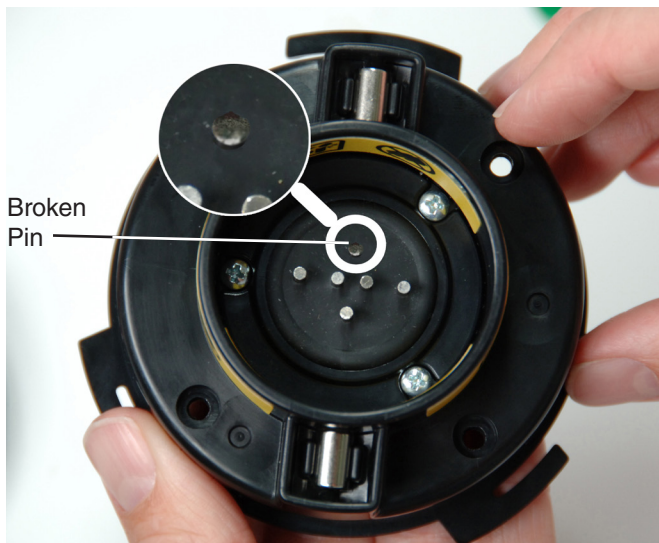


Figure 16 – Broken contact pin

If the system cable slip-ring assembly is not installed, insert the slip-ring assembly into the center of the rear case. Twist clockwise until it locks into position.



Figure 17 – Slip-ring assembly in locked position

Installing rM200 Pipe Guides

Pipe guides improve picture quality by centering the camera in the pipe and by keeping the lens free of sludge. Use pipe guides whenever possible to reduce wear and tear on the camera system.

The rM200 comes with two kinds of pipe guides: two ball guides and a smaller camera head pipe guide that help you push the camera through stubborn fittings.

Installing Ball Guides

Ball guides can be easily removed or adjusted along the length of the camera to allow for better movement in pipes. Placing two ball guides near the front of the camera tilts the camera head upward so you can see the top of the pipe.

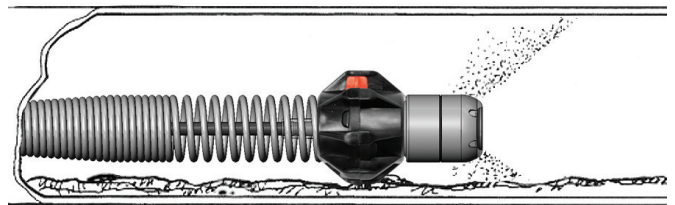


Figure 18 – Ball guide in use

Ball guides are designed to easily slip onto the camera spring and lock into place. Install the ball guides by doing the following:

1. Slide the red locks away from the blue locks.
2. Press the small tabs on the blue locks so they click. You have unlocked the ball guide when the blue tabs are flush with the inside of the guide.
3. Slide the ball guide into position over the camera head.
4. Press down on the blue latches to lock the ball guide into the spring.
5. Slide the two red sliding locks back over the blue latches.

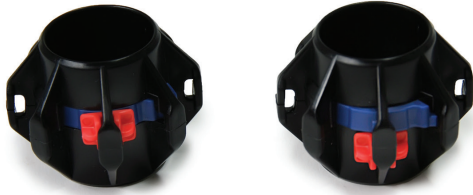


Figure 19 – Locked (left) and unlocked (right)

Installing the Camera Head Guide

For smaller pipes, tubes, or voids, the camera head guide may be installed. Install the camera head guide by doing the following:

1. Unscrew both halves of the camera head guide.
2. Slide on the camera head with the screw holes aligned.
3. Screw halves together being careful not to over-tighten.



Figure 20 – Camera head pipe guide

Installing rM200 Handles and Docks

Carry Handle

The rM200 shoulder strap can be connected directly to the frame as well as onto the carry handle. The carry handle can be removed and replaced with the docking handle for use with a CCU. The rM200 is shipped with the carry handle installed.

Docking Handle

The docking handle was designed specifically for use with SeeSnake CCUs and can be used in place of the carry handle.



Figure 21 – Docking handle

Installing the Docking Handle

1. Lay the rM200 flat on its back.
2. Push camera head through the push cable guide until it is nested completely inside the internal drum (Figure 22).



Figure 22 – Push camera head into internal drum

⚠ CAUTION Make sure the camera head is nested completely inside the internal drum before unlatching and opening the case. If the camera head is not in the drum, the push cable can unspool and damage the push cable or cause serious personal injury.

3. Unwrap system cable from cord wrap.
4. Remove the cord wrap attachments with a Phillips screwdriver and lift it from its sockets (Figure 23).



Figure 23 – Remove cord wrap attachments

5. Slide all six case latches upward to unlock the outer case.
6. Lift front case and remove carry handle (Figure 24).



Figure 24 – Lift front case and remove carry handle

7. The docking handle can be installed either direction. Orient the docking handle according to which direction you want the CCU to face and fit into grooves in the outer case.
8. Place nuts into screw holes on docking handle (Figure 25).



Figure 25 – Place nuts into screw holes

9. Return both sides of the cord wrap and screw into place (Figure 26).



Figure 26 – Reattach cord wrap

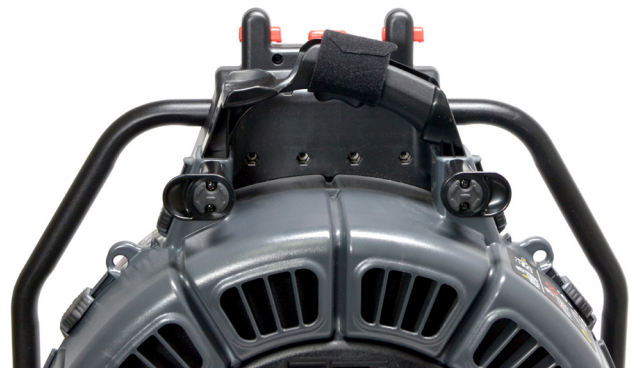


Figure 27 – Docking handle installation complete

Pull Handle

The rM200's pull handle can be set to four different positions. Each position has a different purpose that will facilitate usability and maneuverability.

- Upright to maneuver the unit during transport.
- Midway for use as a kick stand.
- Against the rear case when in use and for storage; especially in small spaces.
- Against the front case for storage and transport when going up or down ladders.



Figure 28 – Pull handle locked upright



Figure 29 – Pull handle as a kick stand



Figure 30 – Pull handle in rear (left) and front (right)

Installing the Stow Bin

The rM200 stow bin is an accessory that provides storage for gloves, a paint can, business cards, pliers or any other tool you want to keep handy. The rM200 comes with one stow bin. Additional stow bins can be ordered and up to two can be installed on each reel.

Installing the Can Holder on the Stow Bin

The can holder on the stow bin must be installed on the front side of the rM200 so that it does not interfere with the pull handle. Change the position of the can holder by following these steps:

1. From the inside of the stow bin, use a Phillips screwdriver to remove the can holder and the replacement plate on the other side of the bin.
2. Install the can holder on the alternate side of the stow bin and screw the replacement plate into place.

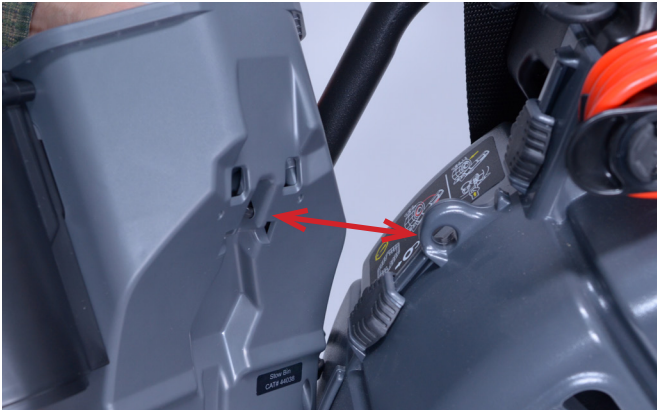


Figure 31 – Two configurations of the can holder

Installing the Stow Bin



1. Push the black button on the inside of the bin.



2. Align the groove on the underside of the bin with the eyelet on the rM200. Push and snap into place.



3. To secure the bin, pull and snap the front and back hooks into the closest reel groove.



Figure 32 – Optional second stow bin installed

NOTE: The stow bin comes with two rubber plugs that can be inserted into the bottom of the main compartment and can holder. The can holders also contain a magnet at the bottom to securely hold can in place.

Maintenance and Cleaning

⚠ WARNING

Maintain equipment to reduce the risk of serious injury and damage to the equipment.

Disconnect the system cable from the CCU before cleaning to reduce the risk of electrical shock.

NOTICE Water can enter the hub and damage the slip rings. Do not fill the drum with water while the unit is tipped on its back.

Use a soft, damp cloth to wipe the rM200 clean. If desired, use a disinfectant to clean the rM200. Using solvents to clean any part of the system can crack the LED ring and affect waterproofing.

Stand the reel upright and fill the bottom of the drum with lukewarm water and a mild detergent to thoroughly clean the reel and drum. Spin the drum to loosen the grime. Remove the water, pull out the cable, and run a rag over the cable while feeding it back into the drum.

Use a hose or pressure washer to clean the drum when it is empty. Avoid hosing the contact board on the back of the drum.

Camera Maintenance

Camera Head

NOTICE Do not sand the LED ring to remove scratches.

Use a soft nylon brush, mild detergent, and rags to clean the camera, spring assembly, and cables. Scraping tools may permanently scratch the camera.

Other than keeping the LED ring and sapphire window clean, the camera head requires little maintenance. Scratches on the LED ring will have a minimal effect on the performance. To avoid damaging the watertight housing, do not sand the LED ring to remove scratches.

Spring Assembly

Stretch the spring and stir it in warm water to flush grime from the spring assembly. Do not allow sharp objects or harsh chemicals to remain on the spring. Stretch the spring end-to-end as far as the internal push cable allows, to visually inspect the joint.

Push Cable Maintenance

Keeping the push cable clean makes it easier to spot excessive cuts or abrasions and also makes it easier to grasp and push. Reduce cable grime by running the cable through a rag as it enters the reel.

Visually inspect the cable for cuts and abrasions while feeding it back into the drum. Replace or repair the cable if the outer jacket is cut or abraded through.

Accessories

WARNING

The following RIDGID products have been designed to function with the rM200. Accessories suitable for use with other tools may become hazardous when used with the rM200.

To reduce the risk of serious injury, only use the following accessories specifically designed and recommended for use with the rM200:

- rM200 Slip-Ring Cartridge (Interconnect for SeeSnake)
- RIDGID-SeekTech or NaviTrack Receivers
- RIDGID-SeekTech or NaviTrack Transmitters
- RIDGID-SeeSnake Max CCUs
- RIDGID-SeeSnake Original CCUs

Transport and Storage

Store equipment in a locked area, out of reach of children and people unfamiliar with its operation. Do not expose to heavy shocks or impacts during transport.

Store electrical devices in a dry place to reduce the risk of electrical shock. Store in temperatures from -40°C to 65°C [-40°F to 150°F]. Store the unit away from heat sources such as radiators, heat registers, stoves, and other products (including amplifiers) that produce heat.

Service and Repair

WARNING

Improper service or repair can cause the rM200 to be unsafe to operate.

Service and repair of the rM200 must be performed at a RIDGID Independent Authorized Service Center.

For information on your nearest RIDGID Independent Service Center or any service or repair questions:

- Contact your local RIDGID distributor.
- Visit www.RIDGID.com or www.RIDGID.eu to find your local Ridge Tool contact point.
- Contact RIDGID Technical Services Department at rtctechservices@emerson.com or, in the U.S. and Canada, call 800-519-3456.

Disposal

Parts of the rM200 contain valuable materials that can be recycled. Companies that specialize in recycling may be found locally. Dispose of the components in compliance with all applicable regulations. Contact your local waste management authority for more information.



For EC Countries: Do not dispose of electrical equipment with household waste!

According to the European Guideline 2002/96/EC for Waste Electrical and Electronic Equipment and its implementation into national legislation, electrical equipment that is no longer usable must be collected separately and disposed of in an environmentally correct manner.

Troubleshooting Faulty Components

Use a working camera head to isolate faulty components in the system. Plug the working camera head directly into the CCU system connector to test the CCU. Plug the working camera head into the hub end of the System Cable or into the push cable connector inside the drum to test each link in the series.

Attempt to isolate the fault to one of the following major components:

- Camera head
- Reel
- System cable
- CCU

**Table 3
Troubleshooting**

Problem	Probable Fault Location	Solution
Camera image not seen	No power to SeeSnake CCU	Check power cord is correctly plugged in.
		Check the switch on monitor/display unit.
	Connection is faulty	Check alignment and pins of connection between SeeSnake system unit and CCU.
		Check orientation, seating, and pin condition in the SeeSnake connection.
	Video Source incorrect	Verify that the video source is set correctly as described in the CCU's Operator's Manual.
Batteries low	Recharge or replace batteries in CCU.	
Count accuracy is unreliable	Settings incorrect for reel or push cable	Verify the settings are correct for the SeeSnake cable length, cable diameter and reel type you are using.
	Counting from a zero point other than the one intended	Confirm you are measuring from the intended zero point.
Intermittent video failure	Bearing ring missing	Replace bearing ring
"SOS" code blinking on LCD*	No video signal	Check source setting of monitor and re-seat cable connection.

* The light on the LCD will only blink the "SOS" code on some SeeSnake CCUs.

Notes

Ridge Tool Company

400 Clark Street
Elyria, Ohio 44035-6001
U.S.A.

www.RIDGID.com
1-800-474-3443

Ridge Tool Europe

Research Park Haasrode
3001 Leuven
Belgium

www.RIDGID.eu
+ 32 (0)16 380 280

**We
Build
Reputations™** | **RIDGID®**


EMERSON™
Commercial & Residential Solutions

RIDGID reserves the right to change the specifications of the hardware, software, or both as described in this manual without notice. Visit www.seesnake.com for current updates and supplemental information pertaining to this product. Due to product development, the photos and other presentations specified in this manual may differ from the actual product.

Other trademarks or registered trademarks mentioned in this manual are the property of their respective owners.