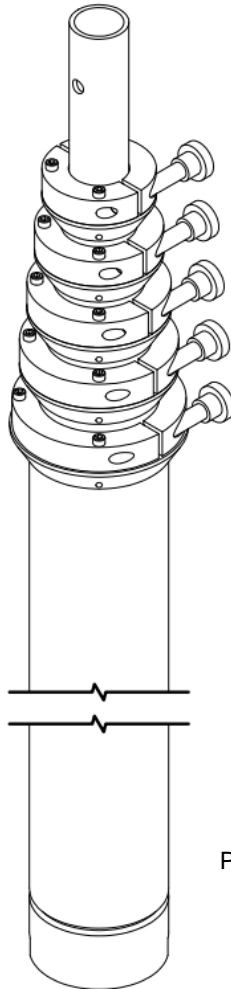




HURRY-UP® TELESCOPING MAST OPERATOR'S MANUAL



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Original Instructions

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Hurry-Up® Mast Warranty

Will-Burt warrants its Hurry-Up® Masts to be free from defects in material and workmanship for a period of two (2) years, with such time period running from the date of shipment by Will-Burt. Will-Burt shall not be responsible for any damage resulting to or caused by its products by reason of failure to properly install, maintain or store the product; use of the product in a manner inconsistent with its design; unauthorized service, alteration of products, neglect, abuse, accident, or acts of God. This warranty does not extend to any component parts not manufactured by Will-Burt; provided, however, Will-Burt's warranty herein shall not limit any warranties by manufacturers of component parts which extend to the buyer.

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Document History

Document	Dates	Remarks
TP-1400 Rev B	Dec. 2011	Initial Release
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Section 1 Safety Summary

This section describes safety instructions for the Hurry-Up® Mast that personnel must understand and apply throughout all product activities such as transportation, handling, installation, operation, maintenance, storage, disposal and troubleshooting. Read and understand this entire document, and contact The Will-Burt Company with any questions, before performing any procedure outlined in this document. Keep this document during the entire duration of use of the device. Pass this document along to trained and qualified end users.

1.1 Signal Word Definitions

The following signal words and definitions are used to indicate hazardous situations:

DANGER

DANGER indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION

CAUTION indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It is also used to alert against unsafe practices.

1.2 Safety Instructions

DANGER

Electrocution Hazard! Contact with high voltage will result in death or serious injury. Observe general safety precautions for handling equipment using high voltage. Do not locate or operate mast near electrical lines, cables or other unwanted sources of electricity. Allow sufficient clearance on all sides of mast to allow for side sway. Do not operate mast during an electrical storm. Be certain electrical cables are undamaged and properly terminated. Do not touch live wires. Follow OSHA or other national safety regulations when working near energized power lines. Personnel working with or near high voltages should be familiar with methods of resuscitation.

DANGER

Disconnect Power for Service! Always disconnect all power sources following proper lock-out tag-out procedures before performing service, repair or test operations. Remove the tethered hand held control where applicable for added protection during maintenance.

⚠ DANGER

Mast Tip Over Hazard! Mast tip over could result in death or serious injury. Before operation, be certain mounting structure is capable of resisting forces generated from all loading and environmental conditions, including, but not limited to, mast size and weight, payload and cable size and weight, payload sail area, wind speed, guy line arrangement, support bracket or roof line location, and base plate assembly. Do not operate in wind speed conditions exceeding the maximum rated wind speed. Do not operate on slopes exceeding the maximum deployment angle. Do not install a payload that exceeds the maximum payload lifting capacity of mast. Do not install a payload with the center of gravity offset from mast centerline exceeding the maximum allowed offset. Stand clear of mast and mast payload during operation. Be certain mast is level and secure before and during installation, operation, and maintenance.

⚠ DANGER

Falling Objects from Mast Hazard! Wear a protective hard hat when working on mast or situated near mast operating area while mast is extending, retracting or deployed in any position above the nested position. Improperly secured payload or mast components, ice formations, etc. could be dislodged from mast and fall. Be sure the payload is properly installed and secured.

⚠ DANGER

Relocation/Driving Hazard! Do not relocate the system during operation or while mast is extended to any height above the nested position or powered up. Do not move vehicle until mast has been securely nested and isolated from power. Power-up and operate mast only if the vehicle is stationary and securely parked with the parking brake properly applied. Do not put mast in service or operate without the vehicle interlock warning circuit or magnetic warning kit installed to provide confirmation mast is nested prior to moving the vehicle. Contact The Will-Burt Company Engineering for special on-the-move situations for military only use on specialized products.

⚠ DANGER

Burst Hazard! For pneumatically operated masts, do not operate without the over-pressure safety valve installed. Keep personnel clear of safety valve exhaust direction. Do not exceed the maximum rated pressure of mast. If the mast air pressure is not fully discharged prior to removing air hoses, a rapid release of air pressure will occur requiring hearing and eye protection.

⚠ WARNING

Payload Lifting Hazard - Intended Use! The mast is intended to lift a specific payload for lighting, surveillance or communication use only. Any other use without written consent is prohibited and could cause death or serious injury. Do not use mast to lift personnel. Do not exceed specified payload capacity. Large payload wind sail areas can reduce payload capacity. Consult The Will-Burt Company engineering.

⚠ WARNING

Read Operating Instructions! Read and observe the operating instructions. Non-observance of the instructions, operation which is not in accordance with use as prescribed in the instructions, wrong installation or incorrect handling can seriously affect the safety of operators and machinery. Adhere to the safety instructions when carrying out any activity relating to the Pneumatic Mast.

⚠ WARNING

Trained Personnel Only! This product is intended for use by trained professionals only. It is not intended for general use by the public or untrained personnel. Handling, installation, operation and maintenance to be performed by trained and authorized personnel only. Only a properly trained and qualified certified electrician should perform electric installations and service.

⚠ WARNING

Erratic Mast Operation Impact Hazard! The mast should operate smoothly during extension and retraction. If erratic mast motion is observed during extension or retraction that results in impact loading between the tube and the tube collar (mechanical travel stop), cease use of the mast and contact The Will-Burt Company service department. Repeated operation with impact loading can damage tubes and lead to mast separation.

⚠ WARNING

Over-current Protection! Over-current protection or power switching by the installer on mast incoming power supply as specified in this document should be a type suitable to allow lock-out tag-out procedures for power disconnect.

⚠ WARNING

Safety Instruction - Explosion! For outdoor use only. Do not use in explosive areas or areas that have been classified as hazardous as defined in Article 500 of the National Electric Code or equivalent national standards. Do not use in the presence of flammable gases or liquids such as paint, gasoline or solvents. Do not use in areas of limited ventilation or where high ambient temperatures are present.

⚠ WARNING

Safety Equipment (PPE)! Proper personal protective equipment (PPE) like hard hats, gloves, and safety shoes shall be properly worn while working on mast or near the deployment area of mast. In addition, eye protection shall be worn during maintenance procedures. Follow national PPE guidelines in your area of operation.

⚠ WARNING

Pinch Point Hazard! Keep clear of all moving parts like mast collars nesting. Be sure to stay clear of system during operation. Moving parts can crush and cut resulting in serious injury. The mast shall be mounted out of reach of the operator during operation.

⚠ WARNING

Crush Hazard - Mast Failure! Do not stand directly beneath mast or its payload. Be certain the payload is properly installed and secured.

⚠ WARNING

Entanglement Hazard! Tangled cables can cause equipment damage. Ensure payload cables, Nycoil®, trip lines, guy lines or other cables are not tangled and are free to pay out as mast is deployed. Cables that get tangled or snagged on mast or other objects can cause mast tubes to lurch upward suddenly when the cable is freed. This can cause damage to mast and lead to mast separation if repeatedly allowed to continue.

⚠ WARNING

Health and Safety Hazard while Cleaning! Solvent used to clean parts is potentially dangerous. Avoid inhalation of fumes and prolonged contact to skin.

⚠ WARNING

Fire Hazard Solvent! Cleaning solvent, used for maintenance, is flammable and can be explosive. Do not smoke near solvent. Use cleaning solvent in a well-ventilated area. Keep cleaning solvent away from ignition sources. Always store cleaning solvent in the proper marked container and in a proper location.

⚠ WARNING

Bright Light Radiation Hazard! For systems equipped with scene lighting or look-up lights, do not look directly into lights when they are illuminated. Temporary impairment or permanent vision damage could occur.

⚠ WARNING

Personnel Freezing/Burn Hazard! If the system is equipped with lights, make sure the lights are completely cool before attempting to clean the lens, replace bulbs or perform maintenance. Wear gloves to protect from contact with exposed metal that may be at extremes of hot and cold temperatures from sun or cold outdoor exposure.

⚠ WARNING

Mast Extension Hazard - Obstruction! Extending mast into obstructions could result in death or serious injury and could render mast inoperable and partially extended. Before applying power and operating mast, be certain there is sufficient clearance above and to all sides of the expected location of the fully extended mast and payload. Keep all persons clear of mast and mast extension. Do not lean directly over mast. Locate the operator station such that the operator has a clear view of the operating space of mast and payload prior to deployment to avoid contact with overhead objects.

⚠ WARNING

Manual Retraction! For powered masts, make sure all power sources have been disconnected from the system prior to manually lowering mast to avoid unexpected start-up motion and/or damage to mast.

⚠ WARNING

Mast Lifting/Handling! Use extreme caution while lifting mast System and when mast System is suspended to avoid injury and equipment damage. Be certain mast is properly secured using at least two sling points at the center of gravity label. All operators should be aware of and follow the applicable local, regional, and national standards and codes of practice for slinging and transporting equipment. Never lift Mast System over people. Ensure lifting equipment including, but not limited to, lifting straps and hoist, are capable of handling the forces generated from lifting the system. Observe manufacturer instructions on lifting equipment.

⚠ WARNING

Remove Payload! For mast systems shipped with no payload (customer installed payloads), remove payload before performing maintenance on mast system. The Will-Burt Company installed devices can remain installed.

⚠ WARNING

Equipment Damage - Submerged! Do not submerge mast in liquid or operate the vehicle in a fording situation that would result in a submerged mast.

⚠ WARNING

Safety Instruction – Keep Clear! Keep personnel clear of the system during operation.

⚠ WARNING

Safety Instruction - Potential Air Contaminants! If internally mounted in a vehicle, air from mast and any accumulated water will discharge into the vehicle. Install appropriate drainage and venting.

⚠ WARNING

Fastener Vibration Hazard! Mast system and payload mounting hardware must include proper means to resist vibration loosening such as thread-locking compound, locking hardware, or equivalent. Use specified assembly torques appropriate for the fastener size.

⚠ CAUTION

Safety Instruction - Guy Anchors! For masts using Guy Lines, verify the Guy Anchor point strength is adequate to support the Guy Line forces.

⚠ CAUTION

Frozen Water Hazard! Water freezing inside mast or air fittings may render mast inoperable and cause major equipment damage such as tube deformation. Ensure water is free to exit at the base of mast. Open drain cock when mast is not in operation. The drain cock shall be installed at the lowest position in the pneumatic system. If mounted internally in a vehicle or structure, direct the draining water to a suitable location. Cover locking masts when not in use to limit water ingress. Non-locking masts stored outdoors should be covered if possible. A cover is available from The Will-Burt Company.

⚠ CAUTION

Lubrication! Do not lubricate the exterior of mast moving tubes. The lubricant will attract dust and other environmental contaminants into mast.

⚠ CAUTION

Equipment Damage - Forces! Before unloading the system, be certain the unloading region is capable of resisting forces generated from unloading the system including but not limited to system weight. Ensure the unloading region is level and has sufficient room and strength to hold the system. If the unloading region is incapable of meeting the requirements of the system, damage to the system and/or unloading region could occur.

⚠ CAUTION

Equipment Damage - Support Bracket! For masts using an upper support bracket, do not over-tighten mast support bracket. Over-tightening may damage the Base Tube causing mast tubes to stick.

⚠ CAUTION

Mast and Payload Access! The operator must provide safe means to access mast and payload during installation, removal and maintenance.

⚠ CAUTION

Tripping Hazard! Cables, trip lines, guy lines and guy anchors can be hard to see during and after installation. Any equipment posing trip hazards should be clearly marked.

⚠ CAUTION

Safety Instruction – Roof Access! If mast will be mounted to a vehicle, user must provide safe means to access the roof of the vehicle during installation and maintenance.

⚠ CAUTION

Lifting Hazard! Manually lifting over 55 lb. (25 kg) is prohibited. In the UK, all lifting equipment must be thoroughly examined annually by a competent person according to the Lifting Operations and Lift Equipment Regulations 1998. Equivalent regulations exist in other EU states.

1.3 Symbols

The following are symbols that are used with the system and their meaning. Contact The Will-Burt Company with any questions before performing any procedure outlined in this manual.



This symbol indicates an electrocution hazard or hazardous voltage hazard. There is DC voltage present inside the mast and control box. Do not operate mast near electrical lines or during lightning events. Contact with high voltage will result in death or serious injury.



This symbol indicates a pinch point hazard. Keep fingers and hands clear of moving parts.



This symbol indicates a tip-over hazard. The mast must be properly supported during transport, installation, maintenance and operation. System tip-over could result in death or serious injury.



This symbol indicates a general warning. In this unit, this symbol indicates a frozen water hazard. Do not block the mast drain port at the base of the unit. Water must be permitted to exit the mast to avoid ice damage to the mast.



This symbol is used to remind users to read and understand the operator's manual before operating the Mast System. Failure to follow operating instructions could result in death or serious injury. Read and understand operator's manual before operating or installing the mast system.



This symbol indicates a hard hat is required when working under the mast operating area. Failure to wear a hard hat could result in death or serious injury.



This symbol indicates an electrical ground connection point.



This symbol is used to indicate the center of gravity (COG) of a fully nested mast.

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Specification Compliance

CE Declaration of Conformity

Refer to the Product page at www.willburt.com for the latest Declaration of Conformity.

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Section 2 Introduction

Thank you for selecting The Will-Burt Company for your critical payload elevation needs. These operating instructions describe transporting, handling, installing, operating, maintaining, storing, and troubleshooting procedures for Hurry-Up® Mast systems. These procedures assume the use of standard mast systems. Procedures and characteristics for mast systems customized to meet customer-specific needs may vary. Review this document in its entirety. Contact The Will-Burt Company with any questions before performing any procedure outlined in this manual.

These operating instructions are intended for professionals who are qualified by their appropriate training and experience to perform the procedures. Review this document in its entirety. Contact The Will-Burt Company with any questions before performing any procedure outlined in this manual.

The views depicted in this manual are provided for clarification and are subject to change without notice. Views are not to scale.

The following models are covered in these operating instructions:

- Hurry-Up® Mast 3.5-7
- Hurry-Up® Mast 5.3-16.4
- Hurry-Up® Mast 5.8-24.3
- Hurry-Up® Mast 6.7-30

This manual is not for the following portable masts:

- Hurry-Up Pump Mast
- QEAM MTS Series
- QEAM MTSV Series
- Ranger Expedition Composite Tripod Masts
- AntennaMast AM2 Aluminum Tripod Masts

2.1 Safety Precautions

Refer to the Safety Summary for precautions to be observed while operating or servicing this equipment.

2.2 Intended Use

The Hurry-Up® Mast is intended for use by professionals in the fire/rescue/first responder/security/towing/broadcast/cellular industries to provide elevated and directional emergency scene lighting and surveillance or communication capabilities. It is not intended for use by nonprofessionals. Do not use the mast to lift personnel.

The Hurry-Up® Mast is intended to be used only when the vehicle is stationary and the vehicle parking brake is properly applied. Do not supply input supply voltage or operate the mast system when the vehicle is in motion. The mast shall remain in the powered-down, nested position during vehicle motion. Contact The Will-Burt Company with any questions on the intended use or available training programs for installation and operation.

2.3 Definitions

The following terms are used throughout this manual:

- **Mast:** refers to the telescoping Hurry-Up® Mast
- **Mast System:** refers to the entire mast system and other optional accessories
- **Payload:** refers to the object or equipment being extended by the mast to an operational height

2.4 Mast Component Descriptions

This section describes major components of a mast system assuming the use of standard catalog mast systems. Characteristics of components customized to meet customer-specific needs may vary. If necessary, contact The Will-Burt Company for additional details.

The exact configuration of the mast may vary. For detailed information on the locations of components in your system, see the drawings that shipped with the system.

Telescoping Mast: The telescoping mast is the structure used to raise the payload to an operational level. It consists of several concentric, nesting tubes, fabricated from aluminum tubes, that extend and retract.

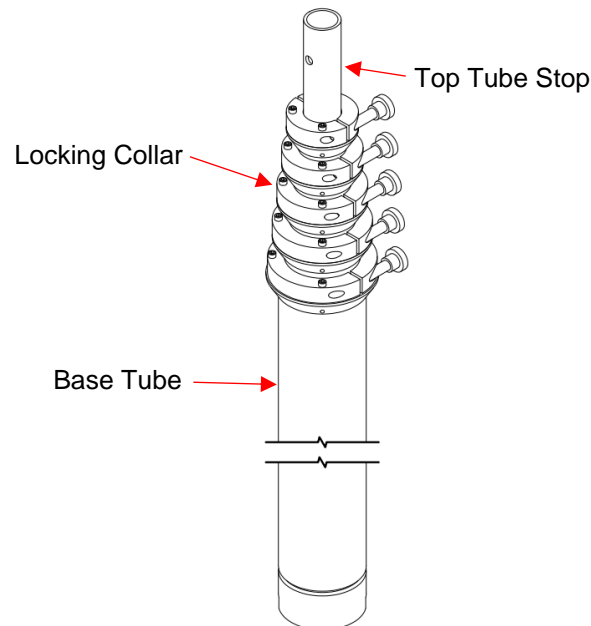


Figure 2-1 Telescoping Masts (Not to Scale)

The base tube is constructed from the tube with the largest diameter and the top tube is constructed from the tube with the smallest diameter. The intermediate tubes are any tube in between the base tube and top tube.

Aluminum collars are fitted to the top end of each tube, except for the top tube, which is fitted with a top tube stop. When the telescoping mast is completely retracted, the collars nest on top of each other. Identification plates are secured to the collar on the base tube.

Hitch Mount (Optional): The Hitch Mount allows the mast to be mounted to the back of the vehicle. The hitch mount is not a permanent mount and can be removed.



Figure 2-2 Hitch Mount (Optional)

Shelf Bracket and Support Bracket (Optional): The shelf bracket and support bracket can be bolted into a support structure to position and support an externally mounted mast. The shelf bracket and support bracket allow the mast to be permanently mounted to a vehicle. When using the shelf bracket, the shelf bracket becomes the mounting surface for the base plate.



Figure 2-3 Shelf Bracket (Left) and Support Bracket (Right) (Optional)

Antenna Stub (Optional): The antenna stub attaches to the top of the mast and is used to secure and support the payload during operation.



Figure 2-4 Antenna Stub (Optional)

Drive-On Stand (Optional): The Drive-On Stand is a ground plate assembly designed to allow the mast to be installed with no guy lines required. A vehicle is driven over the ground plate assembly to hold the plate in place while the mast is operated.

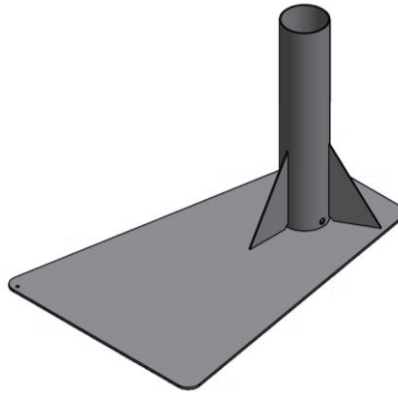


Figure 2-5 Drive-On Stand (Optional)

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Section 3 Technical Data

Table 3-1 Hurry-Up Mast Specifications

	Payload Capacity	Extended Height	Nested Height	Approx. Mast Weight	No. of Sections	Section Diameter	Collar Type
3.5-7	20 lb.	7 ft	3.4 ft	15 lb.	3	3.5 – 2.625 in	Friction Locking
	9.1 kg	2.1 m	1.04 m	7 kg		89 – 67 mm	
5.3-16.4	20 lb.	16.4 ft	5.2 ft	19 lb.	4	3.5 – 2.25 in	
	9.1 kg	5.3 m	1.6 m	9 kg		89 – 57 mm	
6-25	20 lb.	24.3 ft	5.9 ft	29 lb.	6	3.5 – 1.5 in	
	9.1 kg	7.6 m	1.8 m	13 kg		89 – 38 mm	
6.7-30	20 lb.	30 ft	6.6 ft	36 lb.	6	3.5 – 1.5 in	
	9.1 kg	9 m	2 m	16 kg		89 – 38 mm	

Note:

- Payload Capacity assumes a 12 Inch Maximum Offset Payload and a Mast Deployment Angle 0° to 5°.
- Payload Capacity will be affected by wind sail area; consult factory. Payload Capacity includes cable weight.
- Section Diameter listed as Base Tube Diameter – Top Tube Diameter.
- Dimensions and specifications provided are for reference only, and are not intended for vehicle design purposes.
- Specifications may be subject to change without notice.

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Section 4 Installation

This section provides instructions for installing the Hurry-Up® Mast and provides the general procedures that must be followed to ensure a successful installation. Be sure to read and understand the entire installation procedure and the Safety Summary (Section 1) before beginning installation.

4.1 Pre-Installation Check

Before installing the mast system, ensure:

- All installers read and understand the entire installation procedure.
- Only a properly trained and qualified certified electrician performs electric installations and maintenance.
- The mounting structure is level and has sufficient room and strength to mount the mast system.
- All purchased components are included (Section 2.4).
- All required equipment is readily available (Section 4.2).
- When installing in a vehicle, ensure that the vehicle is stationary and on a level surface.

4.2 Recommended Installation Tools

Table 4-1 lists recommended tools and materials for installation.

Table 4-1 Tools and Materials Required for Installation

Tools and Materials		
Wrenches	Screwdrivers	Thread Tape
Safety Gloves	Sling / Strap	Measuring Tape
Sockets	String or Thin Wire	Plumb Bob
Hoist	Torque Wrench	Safety Glasses
Hammer	Level	Saw
Drill	Loctite® 242/243 (Blue) or Equivalent	Pipe Thread Sealant or PTFE Tape
<p>Note: Depending on the national and local standards and codes of practice, and the environment, additional personal protective equipment may be necessary.</p>		

4.3 Unpacking and Handling

Unpack and handle the mast as follows:

1. Carefully open shipping crate.
2. Remove all loose parts, the 2 x 4 inch (38 x 89 mm) block at the top end of the mast and the top half of the wooden mast saddles (Figure 4-1).

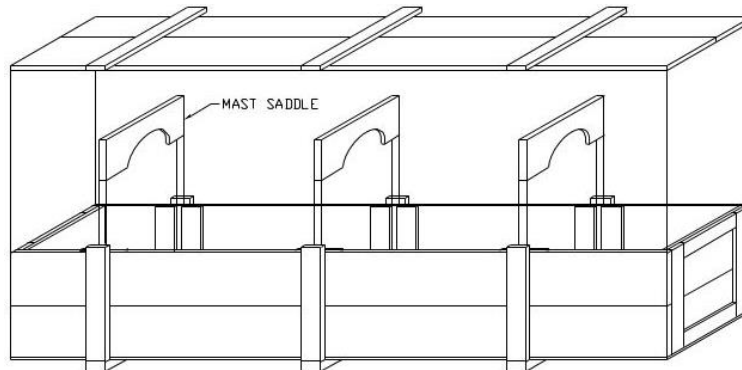


Figure 4-1 Shipping Crate

3. Ensure all components are included and that the required tools are readily available.
4. Inspect for any shipping damage. If damage has occurred, notify the carrier.
5. Carefully lift the mast free from the crate and move the mast into the desired position.

The Will-Burt Company recommends keeping the shipping crate for transporting the mast, for example if shipping the mast back to the factory for refurbishment.

4.4 Select a Suitable Mounting Location

To select a suitable mounting location, consider the following:

- Make sure the vehicle is on a flat, level area.
- The mounting structure must be level, solid, and capable of holding the forces required by the bolts. Check the strength and rigidity of the mounting structure (e.g. vehicle body) where the mast system is to be attached. Reinforce as necessary.
- Check for internal wiring and obstructions in the body where the mast is to be attached. The mounting area must have sufficient room to mount the mast system.
- Select an area free of power lines or other overhead obstructions. The mast should be located no closer than a horizontal distance equal to the extended height of the mast away from any power lines. The ground should be level and firm.
- The area underneath the floor must be free of obstructions to allow for accessibility to base plate fasteners, and if present and used, the bottom air inlet port.

4.5 External Mount Installation (Optional)

Physically attach the system as follows:

1. Securely attach the external shelf bracket to the vehicle. Make sure it is level. The mounting hardware must include proper means to resist vibration loosening, such as thread-locking compound or locking hardware. Torque all hardware as appropriate for its size and grade.
2. Slide the support bracket over the bottom of the mast and insert the base of the mast into the shelf bracket. Rotate the mast so that the slot in the bottom of the mast drops over the key in the bottom of the shelf bracket.
3. Slide the support bracket up the mast to the collar on the base tube. The vertical height of the support bracket should be a maximum of 56 inches from the horizontal surface of the shelf bracket to the top of the support bracket. The minimum should be 50 inches.
4. Secure the support bracket to the wall structure. Spacers may be added between the support bracket and the wall as needed to keep correct alignment between the support bracket and the shelf bracket. Make sure the mast is plumb. The mounting hardware must include proper means to resist vibration loosening, such as thread-locking compound or locking hardware. Torque all hardware as appropriate for its size and grade.
5. If using the optional antenna stub, see Section 4.8 for installation.
6. Periodically inspect all fasteners and welds to make sure the mast is securely attached.

4.6 Drive-On Stand Installation (Optional)

Physically attach the system as follows:

1. Position the ground plate approximately 2 feet in front of or behind a non-drive wheel, preferably on the driver's side of the vehicle.

Note: The mast should not be inserted in the ground plate.

2. Carefully ease the vehicle onto the ground plate. If possible, observe from the driver's side window that the vertical tube does not contact the vehicle as the tire rolls onto the ground plate. Stop the vehicle when the tire is centered on the plate.
3. Stop the engine. Place the transmission in park and engage the parking brake.
4. The mast can now be lowered into the vertical tube on the ground plate assembly. Rotate the mast so that the slot in the bottom of the mast drops over the key in the bottom of the vertical tube.
5. Be sure to allow adequate clearance between the mast and the vehicle to allow for wind deflection.
6. If using the optional antenna stub, see Section 4.8 for installation.



Figure 4-2 Mast Mounted with Drive-On Stand

4.7 Hitch Mount Installation (Optional)

Physically attach the system as follows:

1. Securely attach the hitch mount to the back of the vehicle. Make sure it is level.



Figure 4-3 Secure Hitch Mount to Vehicle

7. If applicable, attach the Anti-Rattle Hitch Tightener to the hitch mount.
8. The mast can now be lowered into the vertical tube on the ground plate assembly. Rotate the mast so that the slot in the bottom of the mast drops over the key in the bottom of the vertical tube.
9. Be sure to allow adequate clearance between the mast and the vehicle to allow for wind deflection.
10. If using the optional antenna stub, see Section 4.8 for installation.

4.8 Antenna Stub Installation (Optional)

To install the antenna stub:

1. Remove the locking pin from the antenna stub.
2. Insert antenna stub into top tube.
3. Line up the antenna stub and top tube holes.
4. Insert the locking pin through the lined-up holes to lock the antenna stub onto the mast.

Note: Twenty (20) pounds is the maximum top load capacity.

4.9 Test the Installation

Follow all precautions while testing the mast system installation.

To test the installation:

1. Review the Pre-Operation Check (Section 5.1) and prepare the mast system for operation.
2. Extend the mast (Section 5.3.1).
3. Lower the mast (Section 5.3.3).

See Section 5 for additional details on these procedures.

4.10 Install the Payload

The exact installation procedures for payload will vary based on the customer-specific payload. For optimal performance, center the payload as best as possible. If the payload must be offset, offset the payload in-line with the keys. Contact The Will-Burt Company with any questions before performing any installation procedures.

In general, to install the payload:

1. Carefully move the payload into position.
2. Properly secure the payload to the mast. The mounting hardware must include proper means to resist vibration loosening, such as thread-locking compound or locking hardware. Torque all hardware as appropriate for its size and grade.

Note: If securing a payload part-way along a mast tube, be sure not to overtighten the tube, or damage to the mast could occur. Intermediate tube clamps are available to assist in attaching payloads to the intermediate tubes. See www.willburt.com for additional information.

Section 5 Operation

This section describes the operation of the mast system. Be sure to read and understand the entire operation procedure and Safety Summary (Section 1) before beginning operation.

5.1 Pre-Operation Check

Before operating the mast system, ensure:

- All operators read and understand the entire operation procedure and are properly trained.
- The mast system is undamaged. If damage is apparent, do not use the mast system, and have it serviced prior to use.
- The area is free of power lines or other overhead obstructions. The mast system location should be no closer than a horizontal distance equal to the extended height of the mast away from power lines.
- Any objects that might obstruct motion of the mast system, cause binding, or hinder mast system function are removed.
- The mast system and payload are properly installed. The mast should be plumb.
- When using a vehicle, the vehicle is not moving and is on level terrain.
- Any transit tie-downs have been removed.
- The mast system area is free of personnel.
- The operator has full view of the mast system during use.

Check with The Will-Burt Company's Engineering for additional wind information for customer-specific loading scenarios.

5.2 Operation Equipment

Table 5-1 lists recommended equipment for operation.

Table 5-1 Equipment Recommended for Operation

Recommended Equipment			
Personal Protective*			
	Safety Glasses	Work Gloves	Nitrile or Vinyl Gloves
	Hearing Protection	Hard Hat or Helmet	Safety Shoes
*Depending on the national and local standards and codes of practice, and the environment, additional personal protective equipment may be necessary.			

5.3 Mast Operation

This section describes operation of the mast system. The exact operating procedures will vary based on the configuration of your mast system. Follow the appropriate operation procedures for your mast system.

5.3.1 Extending the Mast

To extend the mast:

1. Prepare the mast system for operation (Section 5.1).
2. If necessary, secure the payload to the mast.
3. Ensure the payload has enough clearance as the mast is extended.
4. Ensure all locking knobs are tightened. This means that the collars are all locked.
5. Unlock the top tube collar. To unlock the collar, loosen the locking knob (Figure 5-1).

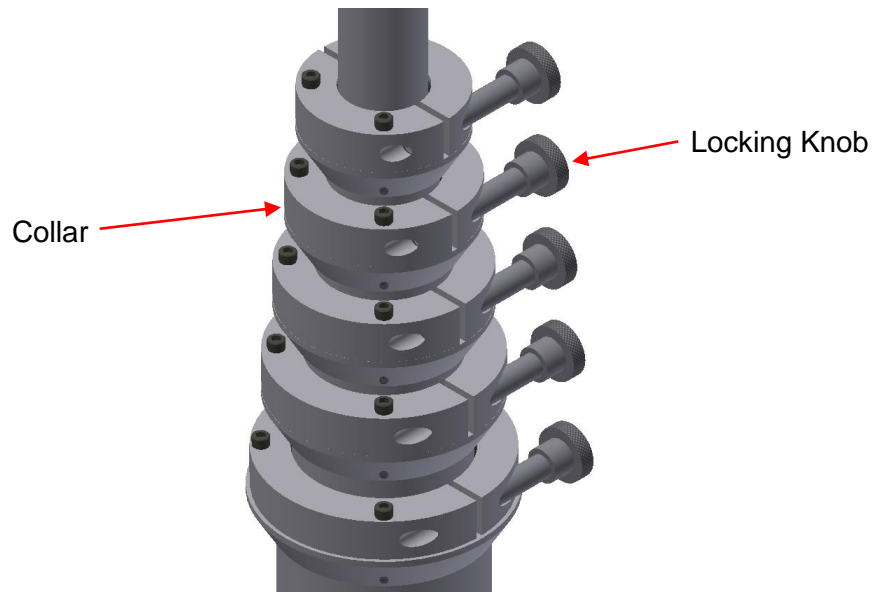


Figure 5-1 Loosen Locking Knob on Collar

6. Push up the top tube until it stops. Relock the collar by tightening the locking knob.



Figure 5-2 Push Up the Top Tube

7. Unlock the next tube collar. Push up the tube. Once it fully extends, relock the section tube collar. Do this procedure for every tube until all tubes are fully extended and tube collars are locked.
8. Maintain visual contact with the mast throughout extension to avoid overhead obstructions.

5.3.2 Rotating the Mast

To rotate the mast:

1. Securely grip the tube just above the bottom collar.
2. Loosen the knob on the collar.
3. Turn the tube to aim the top load.
4. Tighten the knob to relock the collar.

5.3.3 Lowering the Mast

To lower the mast:

1. Ensure the payload will have enough clearance when nested.
2. Unlock the lowest tube collar. To unlock the collar, securely grip the tube just above the bottom collar. Loosen the knob on the collar and carefully lower that tube (Figure 5-3). Take care not to pinch your fingers between the collars as the tube is lowered. The mast will retract by its own weight and the weight of the payload.

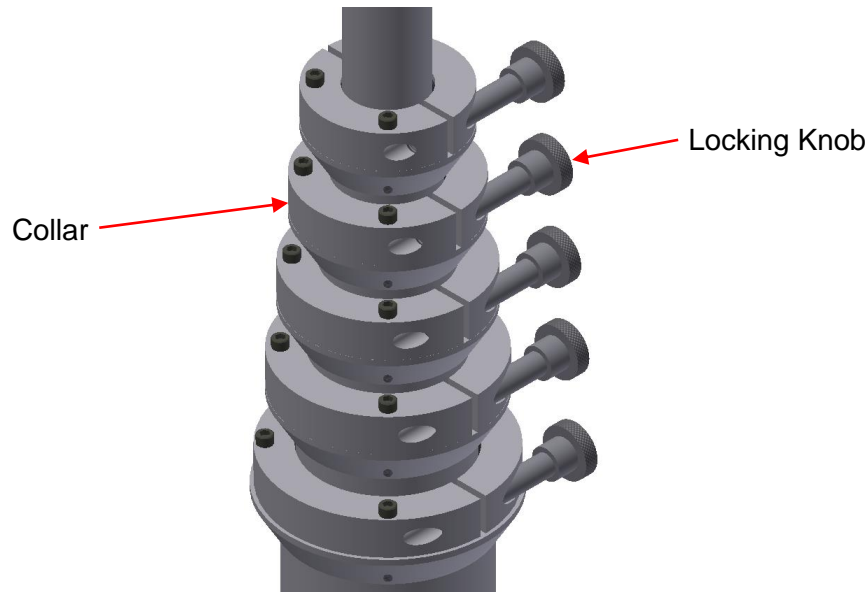


Figure 5-3 Loosen Locking Knob on Collar

3. Once the tube is fully lowered, relock the collar. To relock the collar, tighten the knob.
4. Unlock the next lowest tube collar. Once the next tube is fully lowered, relock the tube collar. Do this procedure for every tube until all tubes are fully lowered and collars are locked.

Note: Stand clear of the top load so it does not hit you as it is lowered.

5. Maintain visual contact with the mast during retraction to avoid payload hang-ups.

Section 6 Transportation

Before transporting the mast system, the mast system needs to be secured. The exact procedures for transportation will vary based on the mast system configuration. The process described in this manual represents a possible method of transporting the mast. Depending on the environment and equipment available, other methods may work better. Use the best and safest method for your circumstances.

6.1 General Transportation

To prepare the mast system for transportation:

1. Ensure the mast is fully nested (Section 5.3). Do not transport the mast system with the mast and payload extended. Always visually confirm the mast is fully retracted before moving the mast.
2. If possible, remove and secure the payload.
3. If necessary, remove and secure the optional antenna stub.
4. If using the Drive-On Stand:
 - a. Remove mast from the ground plate assembly.
 - b. Carefully drive the vehicle off of the ground plate.
 - c. Secure Drive-On Stand for transport.
 - d. Secure mast for transport.
5. If using the hitch mount:
 - a. Remove the mast from the hitch mount.
 - b. If applicable, remove the Anti-Rattle Hitch Tightener from the hitch mount.
 - c. Remove the hitch mount from the vehicle.
 - d. Secure hitch mount for transport.
 - e. Secure mast for transport.
6. If necessary, secure any additional components in the mast system.

Note: The operator should always visually confirm the mast is entirely retracted before moving the vehicle.

6.2 Shipping

When shipping the mast system, The Will-Burt Company recommends shipping the mast in the original shipping crate. If the original shipping crate is not available, contact The Will-Burt Company to order a replacement.

When shipping:

1. As necessary, remove the payload.
2. As necessary, prepare the mast system for transportation (Section 6.1).
3. As necessary, uninstall the mast system from the mounting structure.
4. Secure the mast system in the shipping crate:
 - a. Carefully position the mast in the crate.
 - b. When shipping by air, ensure the air inlet port is open.
 - c. Secure the block at the top of the mast to prevent the mast from shifting in the shipping crate during transportation.
 - d. Secure the top half of the wooden mast saddles.
 - e. As necessary, carefully pack any additional components in the shipping crate.
 - f. Secure the lid on the shipping crate.

Section 7 Maintenance and Disposal

This section describes maintenance procedures required to keep the mast system operational. Use care to understand and follow all precautions while performing these procedures. If the system does not perform as required, see Section 8 for troubleshooting.

Disconnect power to any devices mounted to the mast with lock-out tagout procedures as appropriate before performing mast maintenance.

To order spare or replacement parts, always refer to the mast model number and serial number. This information is included in the operator's manual supplied with each mast. The mast serial number is stamped at the bottom of the base tube. Model number, serial number and additional information is also engraved on the mast identification plate(s). The plate(s) are fixed to the base tube's collar.

7.1 Pre-Maintenance Check

Before performing maintenance procedures, ensure:

- All operators read and understand the entire maintenance procedure and are properly trained.
- The payload is removed prior to performing maintenance on the system.
- The system is level and secure.

7.2 Maintenance Equipment

Table 7-1 lists recommended equipment for maintenance.

Table 7-1 Equipment Recommended for Maintenance

Tools and Materials*			
Personal Protective			
Safety Glasses	Safety Gloves	Safety Shoes	Nitrile or Vinyl Gloves
Hard Hat or Helmet	Hearing Protection		
Hand Tools			
Chisel	Drill	File	Flat Punch
Hammer	Hex Wrenches	Plumb Bob	Measuring Tape
Level	Screwdrivers	Sockets	Wrenches
Torque Wrench	Utility Knife		
Equipment			
Saw Horses or Similar Supports	Hoist	Sling / Strap	Ratchet Straps
Expendables			
Acetone, Alcohol, or other solvent	Pipe Thread Sealant or PTFE Tape	String or Thin Wire	Rags (Clean and Dry)
Loctite® 380 Black Max or equal	Loctite® 495 Instant Adhesive	Factory Approved Grease	Non-Abrasive Cleaners (Soap and Water)
* Note: <ul style="list-style-type: none"> Depending on the local, regional, and national standards and codes of practice, and the environment, additional personal protective equipment may be necessary. When disposing of any disposables or components, do so according to any applicable local, regional, and national standards and codes of practice. 			

7.3 Cleaning

The Will-Burt Company's Hurry-Up Masts should be cleaned on a regular basis to ensure smooth operation and to prolong useful life. Cleaning should be performed whenever the mast tubes are noticeably dirty or become difficult to push up.

Note: It will be much easier if two people can perform this procedure.

To clean the mast:

1. Remove top load from the mast.
2. Set up the mast as described in the operation instructions (Section 5.1).
3. With one person pushing a mast tube up, the other person can wipe the tube clean using a non-abrasive cleaner or solvent such as lacquer thinner. Do not allow the cleaning fluid or solvent to run down inside the collar.

Note: Take care not to pinch your fingers between the collars as each tube is lowered.

4. Repeat this procedure for all of the mast tubes.

7.4 Replace Seals and Collar Lining

This section describes replacing the seals on the mast. Prior to performing corrective maintenance, remove:

- The payload from the mast
- The mast from the mounting structure
- Any plugs from the air inlet ports

To disassemble the mast:

1. Place the mast horizontally on a pair of saw horses or similar supports. Secure the base tube to the supports so that the mast does not roll off. Use care to follow all applicable lifting precautions whenever lifting the mast or components of the mast.
2. Disassemble the mast starting with the top tube and work towards the base tube. To remove the top tube, remove the three 10-32 flat head screws from the top collar. Slide it off the end of the top tube.
3. Slide the top tube out. Do not drop the tube as it comes out. Use care to follow all applicable lifting precautions whenever lifting the mast or components of the mast.

Note: The nylon stop panel / bearing will come out with the tube. This is a 1/32" thick sheet of nylon.

4. To remove the next tube, remove the three 10-32 flat head screws from the next collar. Repeat this procedure for each subsequent mast tube.
5. Remove the old seal from the bottom of each tube and clean the seal groove.

6. Thoroughly clean and inspect the inside and outside of each tube with solvent such as lacquer thinner. Do not use anything that might scratch the surface of the tubes. Tubes may need to be cleaned repeatedly before reassembly to remove all debris.
7. Clean and inspect the dampening seals. Worn or cut seals should be replaced.
8. Inspect each collar to make sure the collar lining material on the inside is secure. If any tubes have been sliding down after being locked in the extended position, it may be due to a worn collar lining. If the collar lining is to be replaced, remove all old collar lining and any adhesive from the inside of the collar.
9. Cement the new collar lining in place using Loctite® 380 Black Max or equal. Follow the manufacturer's instructions.

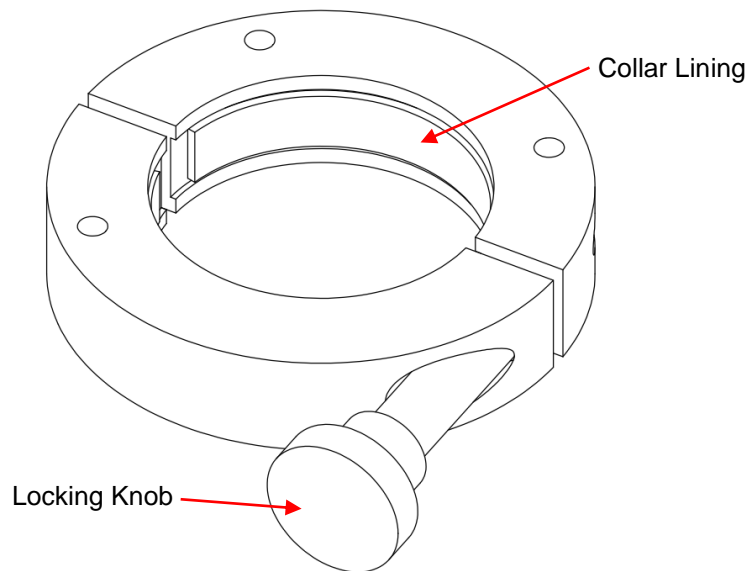


Figure 7-1 Collar Assembly

10. Lubricate the seals with factory approved grease. With the lip edge of the seal toward the bottom end of the tube, slide it onto the butt plate and into the seal groove.
11. For the first 4 or 5 inches in from the top end of the tube, apply a thin coat of grease to the inside surface of all mast tubes. Do not lubricate the inside of the top tube.

12. When reassembling the mast, start with the base tube and work towards the top tube. Secure the base tube of the mast horizontally on the saw horses or similar supports.
13. Using a second person or a brace to support the top end, hold the next tube so that the top end of the tube is at a lower elevation than the seal end. Rest the lip of the seal on the inside of the base tube or receiving tube (Figure 7-2). Use care to follow all applicable lifting precautions whenever lifting the mast or components of the mast.

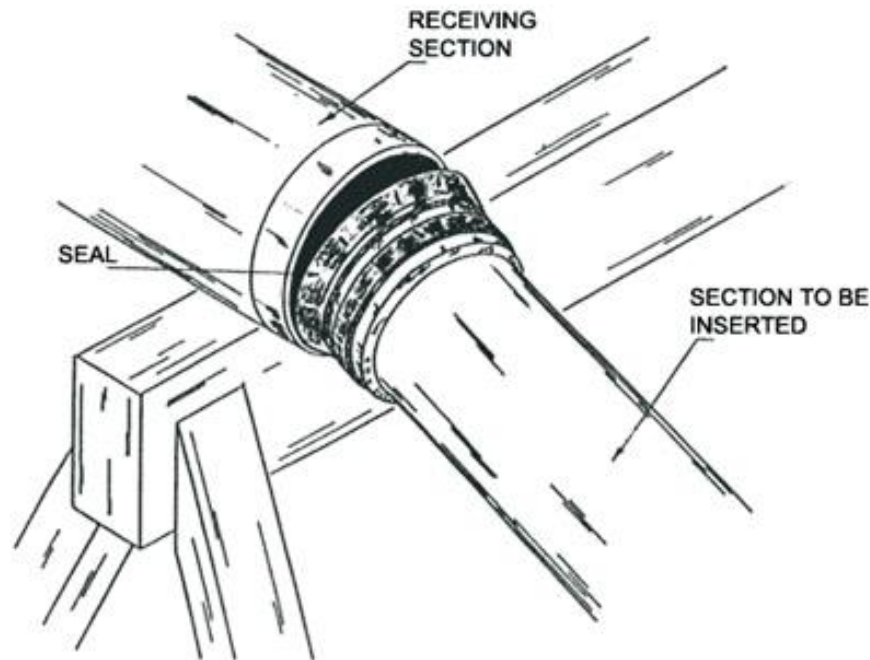


Figure 7-2 Seal Replacement

14. Slowly raise the lower end of the tube to horizontal while carefully pressing the lip of the seal into the receiving tube. Use your thumbs and forefingers to simultaneously press on both sides of the seal in an upward motion. Work this way until your fingers meet at the top.
15. To make sure that the seal is in correctly, slide the tube back and forth within the receiving tube. If the tube has difficulty in its travel, pull it out and follow the appropriate steps to re-lubricate the seal and re-insert the tube. Test again to see that the seal is in correctly. Once the seal is correctly inserted, slide the collar to the top of the tube. Wrap the nylon stop panel around the tube and slide it in.
16. Line up the holes in the collar with the holes in the sleeve flange on the top of the receiving tube. Replace the three 10-32 flat head screws.

Note: The screws used to attach the collar to the sleeve flange have a plastic pellet. The pellet will help keep the screws from turning once tightened or adjusted. After the screws have been removed twice, it is recommended to obtain new screws of this type or use a thread-locking liquid comparable to Loctite® 495 Instant Adhesive.

17. Repeat steps 10-16 for each tube going from the largest to the smallest.

7.5 Long-Term Storage

When putting the system into long-term storage, ensure the:

- Mast is fully nested (Section 5.3).
- Mast is stored in a clean and dry environment.
- Mast is stored vertically when storing for more than six months with provisions to keep the mast from tipping over.
- Mast is extended and lowered every six months (Section 5).

7.6 System Disposal

Dispose of the mast in accordance with the national environmental regulations.

Section 8 Troubleshooting

This section describes troubleshooting for the mast system. Use care to understand and follow all precautions while troubleshooting the mast system.

Table 8-1 Troubleshooting

Problem	Possible Cause(s)	Possible Solutions
Mast frozen in extended position		
	Base tube not drained routinely. Typically freezes around collar area.	<ol style="list-style-type: none"> 1. Wrap warming blankets around collar until ice melts. Use heat gun or 500W quartz light. 2. Inject 1 oz. Will-Burt Antifreeze (P/N: 4735801), suited for aluminum engines, where top of collar and intermediate tube meet.
	There is ice buildup on the exterior of the mast.	Clear build-up ice on the exterior of the mast. Follow the Instructions for Clearing Ice Buildup on the Exterior of a Pneumatic Mast (TP-5253501).
Mast frozen in nested position		
	Base tube not drained routinely. Typically damages tubes.	Send to manufacturer for repair or replacement.
Largest intermediate tube stuck		
	Support bracket too tight.	Loosen bolts. Shim as necessary between clamp halves.
Mast will not lower without rocking		
	Mast not lubricated in extreme conditions.	See Section 7.3 for mast cleaning and lubrication.
	Not enough weight.	<ol style="list-style-type: none"> 1. Apply mast cleaning and greasing procedures. 2. Add weight to platform or stub adapter.
	Bent tube.	Check tube trueness. If bent, order replacement.
Tubes slide down after being locked in extended position		
	Collar lining is worn.	Replace collar lining. See Section 7.4 to replace collar lining.
Rotational movement in tubes		
	Collar lining is worn.	Replace collar lining. See Section 7.4 to replace collar lining.
For additional information, please contact The Will-Burt Company's Customer Service at +1 330 684 4000.		

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