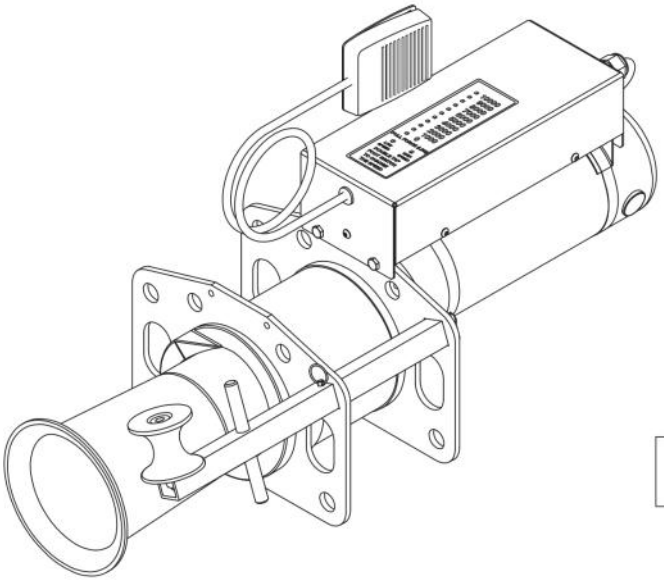
INSTRUCTION MANUAL

GREENLEE®
A Textron Company



UT10 Ultra Tugger® Cable Puller and Pulling Packages

Serial Codes ANB and BBD

Read and **understand** all of the instructions and safety information in this manual before operating or servicing this tool.

Register this product at www.greenlee.com

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Description

The Greenlee UT10 Ultra Tugger® Cable Puller is intended to be used to pull cable through conduit and in tray. The UT10 will develop 44.5 kN (10,000 lb) of pulling force. Refer to a Greenlee catalog for sheaves, pulling rope, and other cable pulling accessories to create an entire cable pulling system.

No single manual can provide instructions for every possible cable pulling application; this manual contains general information necessary to accomplish cable pulls of many different setups.

Safety

Safety is essential in the use and maintenance of Greenlee tools and equipment. This instruction manual and any markings on the tool provide information for avoiding hazards and unsafe practices related to the use of this tool. Observe all of the safety information provided.

Purpose of this Manual

This manual is intended to familiarize all personnel with the safe operation and maintenance procedures for the Greenlee UT10 Ultra Tugger® Cable Puller.

Keep this manual available to all personnel.

Replacement manuals are available upon request at no charge at www.greenlee.com.

All specifications are nominal and may change as design improvements occur. Greenlee Textron Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

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KEEP THIS MANUAL

GENERAL SAFETY RULES

WARNING! Read and understand all instructions. Failure to follow all instructions listed below may result in electric shock, fire, and/or serious personal injury.

SAVE THESE INSTRUCTIONS

WORK AREA SAFETY

Keep your work area clean and well lit. Cluttered benches and dark areas invite accidents.

Do not operate power tools in explosive atmospheres, such as in the presence of flammable liquids, gases, or dust. Power tools create sparks which may ignite the dust or fumes.

Keep bystanders, children, and visitors away while operating a power tool. Distractions can cause you to lose control.

ELECTRICAL SAFETY

Grounded tools must be plugged into an outlet properly installed and grounded in accordance with all codes and ordinances. Never remove the grounding prong or modify the plug in any way. Do not use any adapter plugs. Check with a qualified electrician if you are in doubt as to whether the outlet is properly grounded. If the tools should electrically malfunction or break down, grounding provides a low resistance path to carry electricity away from the user.

Avoid body contact with grounded surfaces such as pipes, radiators, ranges, and refrigerators. There is an increased risk of electric shock if your body is grounded.

Do not expose power tools to rain or wet conditions. Water entering a power tool will increase the risk of electric shock.

Do not abuse the cord. Never use the cord to carry the tools or pull the plug from an outlet. Keep cord away from heat, oil, sharp edges or moving parts. Replace damaged cords immediately. Damaged cords increase the risk of electric shock.

When operating a power tool outside, use an outdoor extension cord marked "W-A" or "W." These cords are rated for outdoor use and reduce the risk of electric shock.

PERSONAL SAFETY

Stay alert, watch what you are doing and use common sense when operating a power tool. Do not use tool while tired or under the influence of drugs, alcohol, or medication. A moment of inattention while operating power tools may result in serious personal injury.

Dress properly. Do not wear loose clothing or jewelry. Contain long hair. Keep your hair, clothing, and gloves away from moving parts. Loose clothes, jewelry, or long hair can be caught in moving parts.

Avoid accidental starting. Be sure switch is off before plugging in. Carrying tools with your finger on the switch or plugging in tools that have the switch on invites accidents.

Remove adjusting keys or switches before turning the tool on. A wrench or a key that is left attached to a rotating part of the tool may result in personal injury.

Do not overreach. Keep proper footing and balance at all times. Proper footing and balance enables better control of the tool in unexpected situations.

Use safety equipment. Always wear eye protection. Dust mask, non-skid safety shoes, hard hat, or hearing protection must be used for appropriate conditions.

TOOL USE AND CARE

Use clamps or other practical way to secure and support the workpiece to a stable platform. Holding the work by hand or against your body is unstable and may lead to loss of control.

Do not force tool. Use the correct tool for your application. The correct tool will do the job better and safer at the rate for which it was designed.

Do not use tool if switch does not turn it on and off. Any tool that cannot be controlled with the switch is dangerous and must be repaired.

Disconnect the plug from the power source before making any adjustments, changing accessories, or storing the tool. Such preventive safety measures reduce the risk of starting the tool accidentally.

Store idle tools out of reach of children and other untrained persons. Tools are dangerous in the hands of untrained users.

Maintain tools with care. Keep cutting tools sharp and clean. Properly maintained tools, with sharp cutting edges, are less likely to bind and are easier to control.

Check for misalignment or binding of moving parts, breakage of parts, and any other condition that may affect the tool's operation. If damaged, have the tool serviced before using. Many accidents are caused by poorly maintained tools.

Use only accessories that are recommended by the manufacturer for your model. Accessories that may be suitable for one tool may become hazardous when used on another tool.

SERVICE

Tool service must be performed only by qualified repair personnel. Service or maintenance performed by unqualified personnel could result in a risk of injury.

When servicing a tool, use only identical replacement parts. Follow instructions in the "Maintenance" section of this manual. Use of unauthorized parts or failure to follow maintenance instructions may create a risk of electric shock or injury.

SPECIFIC SAFETY RULES AND SYMBOLS

SAFETY ALERT SYMBOL

This symbol is used to call your attention to hazards or unsafe practices which could result in an injury or property damage. The signal word, defined below, indicates the severity of the hazard. The message after the signal word provides information for preventing or avoiding the hazard.

⚠DANGER

Immediate hazards which, if not avoided, WILL result in severe injury or death.

⚠WARNING

Hazards which, if not avoided, COULD result in severe injury or death.

⚠CAUTION

Hazards or unsafe practices which, if not avoided, MAY result in injury or property damage.

⚠DANGER

Read and understand all of the instructions and safety information in this manual before operating or servicing this tool.

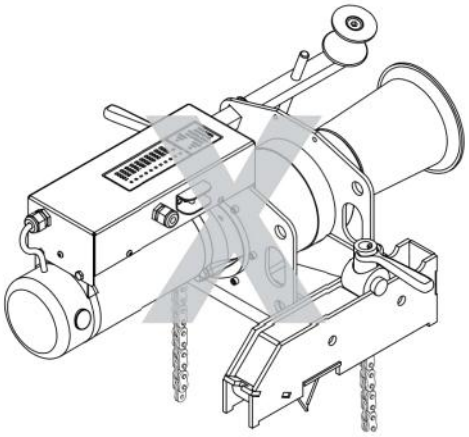
Failure to observe this warning will result in severe injury or death.

⚠DANGER

Do not operate the cable puller in a hazardous environment. Hazards include flammable liquids and gases.

Failure to observe this warning will result in severe injury or death.

⚠DANGER



Do not mount puller as shown above.

Inside of capstan should be centered over conduit.

The chain mount could break away from the mounting, causing severe injury or death.

⚠WARNING

Electric shock hazard:

Disconnect the cable puller from the power supply before servicing.

Failure to observe this warning could result in severe injury or death.

SPECIFIC SAFETY RULES AND SYMBOLS

⚠WARNING

Inspect and verify the maximum load-bearing capacity or maximum strength of all structural supports, pulling system components and anchoring systems before setting up the puller. Any component that cannot withstand the maximum cable pulling forces could break and strike nearby personnel with sufficient force to cause severe injury or death.

⚠WARNING

Do not allow anything other than the pulling rope to contact the capstan. A grip, swivel, or other component could break and strike nearby personnel with great force.

Failure to observe this warning could result in severe injury or death.

⚠WARNING

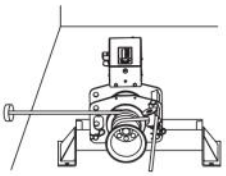
Do not stand directly under a vertical pull. Cable could fall suddenly from the conduit.

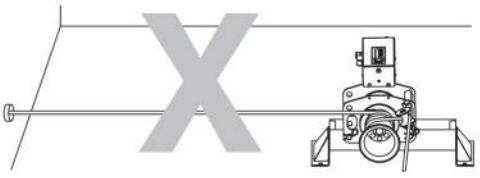
Failure to observe this warning could result in severe injury or death.

⚠WARNING

Locate the puller so that it is close to the conduit. Rope, cable, or connectors can break under tension, causing the rope to whip violently.

Failure to observe this warning could result in severe injury or death.





⚠WARNING

An under-rated or worn rope may break and whip violently. Use a double-braided composite rope with the following minimum characteristics:

Average Breaking Strength:
at least 143 kN (32,000 lb)

Failure to observe this warning could result in severe injury or death.

SPECIFIC SAFETY RULES AND SYMBOLS

⚠WARNING

- Check the condition of the entire rope before use. A worn or damaged rope can break under tension and whip violently.
- Do not maintain a stationary rope on a rotating capstan. The wear generated may cause the rope to break under tension and whip violently.

Failure to observe these warnings could result in severe injury or death.

⚠WARNING

Rope, cable, or a connecting device can break under tension, causing the rope to whip violently.

- Do not allow any unnecessary personnel to remain in the area during the pull.
- Do not allow any personnel to stand in line with the pulling rope.

Failure to observe these warnings could result in severe injury or death.

⚠WARNING

Attach the pulling rope to the cable with appropriate types of connectors as described in this manual. Select connectors with a maximum rated capacity of 44.5 kN (10,000 lb). An under-rated connector can break under tension.

Failure to observe this warning could result in severe injury or death.

⚠WARNING

Do not allow the rope to become overlapped on the capstan. If an overlap begins to develop, relax the tailing force immediately and shut off the cable puller.

Failure to observe this warning could result in severe injury or death.

⚠WARNING

Shear point:

Do not put fingers through holes in elbow unit. Rotating parts may cut off fingers.

Failure to observe this warning could result in severe injury or death.

⚠WARNING

Use this tool for manufacturer's intended purpose only. Do not use the cable puller as a hoist or winch.

- The cable puller cannot lower a load.
- The load may fall.

Failure to observe this warning could result in severe injury or death.

⚠WARNING

Keep hands away from the capstan. Rope at the capstan can crush a hand.

Failure to observe this warning could result in severe injury or death.

⚠WARNING

Always lock boom components in place during assembly or disassembly. Adding and removing components may cause rotation. Parts may strike nearby personnel.

Failure to observe this warning could result in severe injury or death.

⚠WARNING

Do not wrap rope around hands, arms, waist or other body parts. Do not stand in spent coils or tailed rope. Hold rope so that it may be released quickly.

SPECIFIC SAFETY RULES AND SYMBOLS

⚠WARNING

Inspect puller and accessories before use. Replace any worn or damaged components with Greenlee replacement parts. A damaged or improperly assembled item can break and strike nearby personnel with sufficient force to cause severe injury or death.

⚠WARNING

Entanglement hazard:

- Do not operate the cable puller while wearing loose-fitting clothing.
- Retain long hair.

Failure to observe this warning could result in severe injury or death.

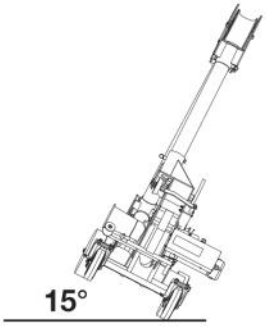
⚠WARNING

Wear eye protection when using this tool. Failure to wear eye protection could result in severe eye injury from flying debris.

⚠WARNING

When using the wheeled carriage to transport the UT10:

- Keep personnel out of the path of transport.
- Evaluate the terrain over which the carriage is to move. If in doubt, obtain additional help and move the carriage slowly.
- Do not transport over inclines of more than 15°.
- Do not transport the carriage with boom tubes longer than the supplied 3' and 4' tubes.



Note: Keep all decals clean and legible, and replace when necessary.

Grounding Instructions

⚠WARNING

Electric shock hazard:

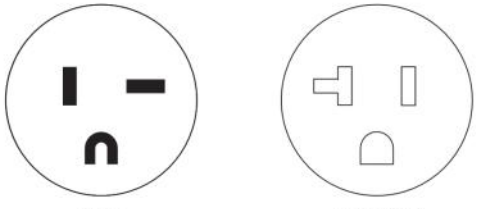
Connect this tool to a grounded receptacle on a 20 amp GFCI-protected circuit.

Failure to observe this warning could result in severe injury or death.

This tool must be grounded. In the event of a malfunction or breakdown, an electrical ground provides a path of least resistance for the electric current. This path of least resistance is intended to reduce the risk of electric shock to the operator.

This tool's electric cord has a grounding conductor and a grounding plug as shown. Do not modify the plug. Connect the plug to receptacle that is properly installed and grounded in accordance with all national and local codes and ordinances. Do not use an adapter.

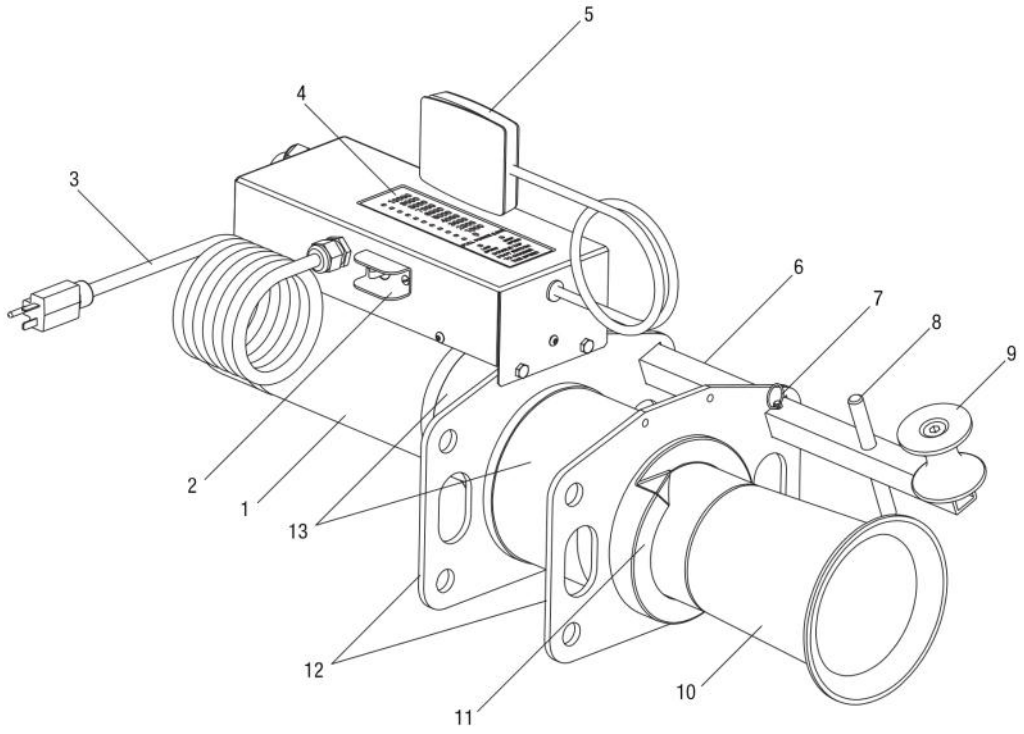
20 Amp / 115 Volt
Plug and Grounded Receptacle



Plug Receptacle

FUNCTIONAL DESCRIPTION

Identification



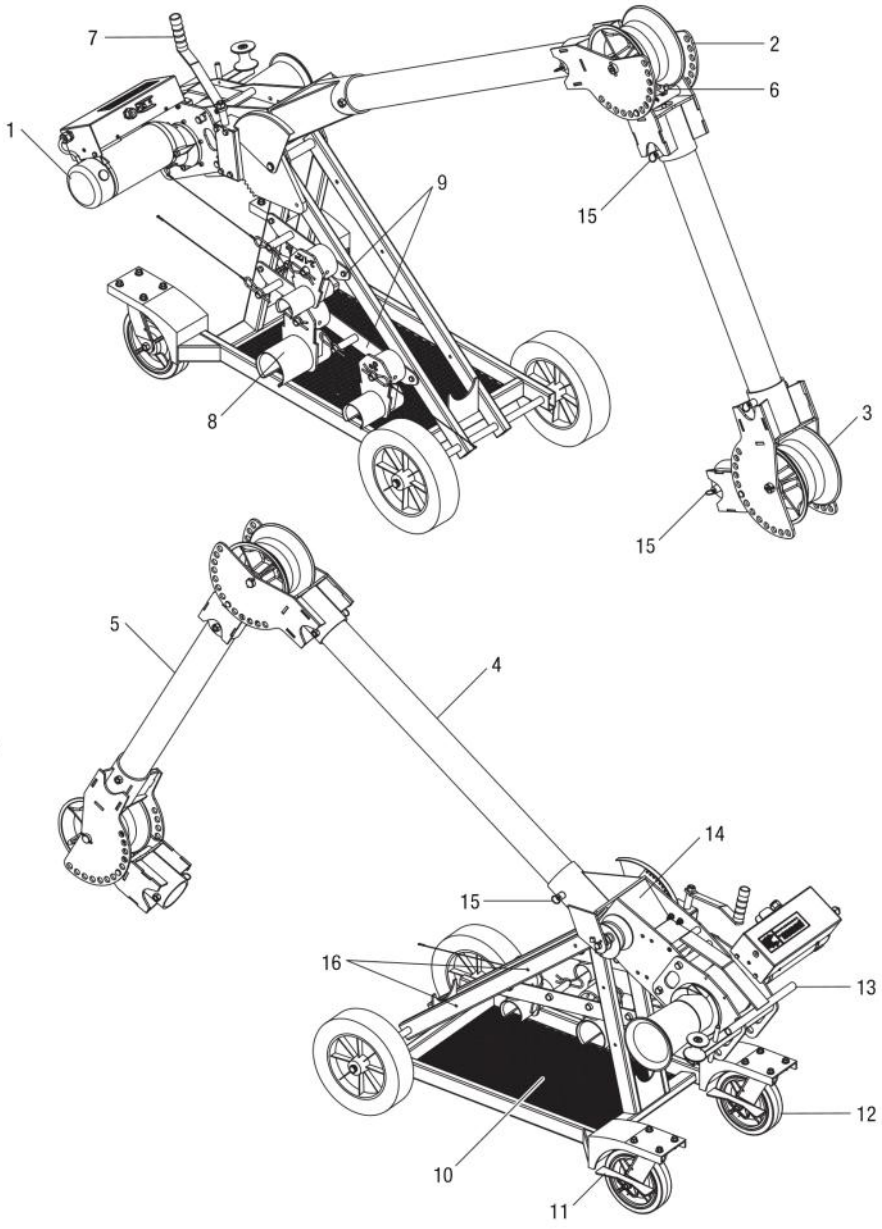
UT10 Cable Puller

1. Motor
2. Circuit Breaker/Switch
3. Power Cord
4. Force Gauge
5. Foot Switch
6. Adjustable Sheave Bracket
7. Hitch Clip
8. Rope Tie-Off
9. Right Angle Sheave
10. Tapered Steel Capstan
11. Rope Ramp
12. Mounting Plates
13. Gearbox

Identification (cont'd)

Mobile Carriage and Boom

1. Puller
2. Elbow
3. Nose
4. Back Boom
5. Forward Boom
6. Detent Pin
7. Crank
8. Conduit Adapter Couplings
9. Adapter Storage Hanger
10. Storage Tray
11. Brake
12. Swivel Caster
13. Transport Handle
14. Boom Mount
15. Ring Pull Detent Pin
16. Location for Additional Adapter Storage Racks



Specifications

Weight	38 kg (84 lb)	
Dimensions		
Length	29 cm (11.5")	
Width	66 cm (26")	
Height	17 cm (6.75")	
Motor		
Voltage	120/230 VAC, 50/60 Hz, single phase	
Current Draw at Full Load	20 amps (120 V), 12 amps (230 V)	
Sound Level	75 dB at 1 meter	
Power Source	120 VAC, 60 Hz, 20 amps, single phase 230 VAC, 50 Hz, 12 amps, single phase	
Speed	**LOW**	**HIGH**
No Load	2.74 m/min (9 ft/min)	4.88 m/min (16 ft/min)
8900 N (2000 lb)	2.44 m/min (8 ft/min)	4.27 m/min (14 ft/min)
17.8 kN (4000 lb)	2.29 m/min (7.5 ft/min)	3.66 m/min (12 ft/min)
26.7 kN (6000 lb)	2.13 m/min (7 ft/min)	—
35.6 kN (8000 lb)	1.83 m/min (6 ft/min)	—
Pulling Force		
0 kN to 28.9 kN (0 lb to 6500 lb)	Continuous operation	
28.9 kN to 35.6 kN (6500 lb to 8000 lb)	5 minutes on / 5 minutes off	
35.6 kN to 44.5 kN (8000 lb to 10,000 lb)	Momentary	
Pulling Rope		
Required Rope	7/8" diameter, double-braided, polyester composite	
Average Breaking Strength	143 kN (32,000 lb) minimum	

Cable Pulling Glossary

anchoring system

any item or group of items that keeps a cable pulling component in place during the cable pull

capstan

the hollow cylinder of the cable puller that acts on the pulling rope to generate pulling force

coefficient of friction

the ratio that compares two amounts of force: (1) the force needed to move an object over a surface and (2) the force holding the object against the surface

This ratio is used to describe how the capstan and the rope work together.

connector

any item, such as a wire grip, clevis, swivel, or pulling grip, that connects the rope to the cable

direct line of pull

the areas next to the pulling rope and along its path; this includes the areas in front of, in back of, and underneath the rope

maximum rated capacity

the amount of pulling tension that any component can safely withstand, rated in kilonewtons (metric) or pounds; the maximum rated capacity of every component must meet or exceed the maximum pulling force of the cable puller

Newton (N)

a metric unit of force, equivalent to 0.225 pounds of force

pipe adapter sheave

attaches to conduit for pulling or feeding cable

pulling grip

connects the rope to the cable; consists of a wire mesh basket that slides over the cable and grips the insulation

pulling force

the amount of pulling tension developed by the cable puller, rated in newtons (metric) or pounds; a cable puller is usually described by the maximum pulling force that it can develop

resultant force

any force that is produced when two or more forces act on an object; applies to the sheaves of a cable pulling system

rope ramp

a device that works with a tapered capstan; guides the rope onto the capstan to prevent rope overlap

sheave

a pulley that changes the direction of the rope and cable

stored energy

the energy that accumulates in the pulling rope as it stretches, described in newton-meters (metric) or foot-pounds

support structure

any stationary object that a cable pulling system component is anchored to, such as a concrete floor (for the floor mount) or an I-beam (for a sheave)

tactile feedback

the way the rope feels as it feeds off of the capstan; the feel of the rope provides information about the progress of the pull to the operator

tail

the portion of the rope that the operator applies force to; this is the rope coming off of the capstan, and is not under the tension of the pull

tailing the rope

the operator's main function; this is the process of applying force to the tail of the pulling rope—refer to the complete explanation under "Cable Pulling Principles"

wire grip

connects the rope to the cable; some use a set screw to clamp onto the conductors of the cable

Cable Pulling Principles

Pulling cable is a complex process. This section of the manual describes and explains four main topics of pulling cable:

- Each cable pulling system component
- How these components work together
- Forces that are generated
- Procedures for the cable puller operator to follow

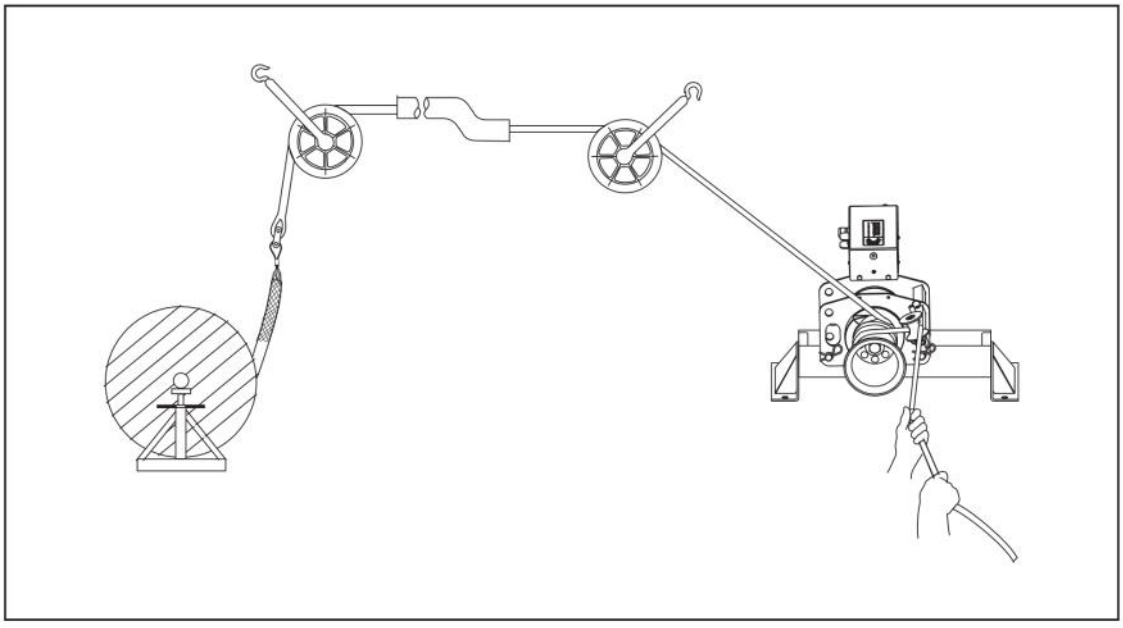
While reading through this section of the manual, look for components that are shaded in the illustrations. The shading indicates components that are associated with the text.

Greenlee strongly recommends that each member of the cable pulling crew review this section of the manual before each cable pull.

Cable Pulling Systems

Pulling cable requires a system of components. At a minimum, a cable pulling system will include a cable puller, a cable pulling rope, and connectors to join the rope to the cable. Most systems will also include, but are not limited to, a cable puller anchoring system, pulling sheaves, and sheave anchoring systems.

The cable puller has a maximum amount of *pulling force*, which is the amount of pulling tension that it develops. Every other component of the pulling system has a *maximum rated capacity*, which is the amount of pulling tension that it can withstand. The maximum rated capacity of every component must meet or exceed the cable puller's maximum pulling force.



Typical Cable Pulling System

Cable Pulling Principles (cont'd)

Pulling Theory

This section introduces the main ideas involved with pulling cable.

Pulling Resistance

The cable puller must overcome two types of resistance: gravity and friction.

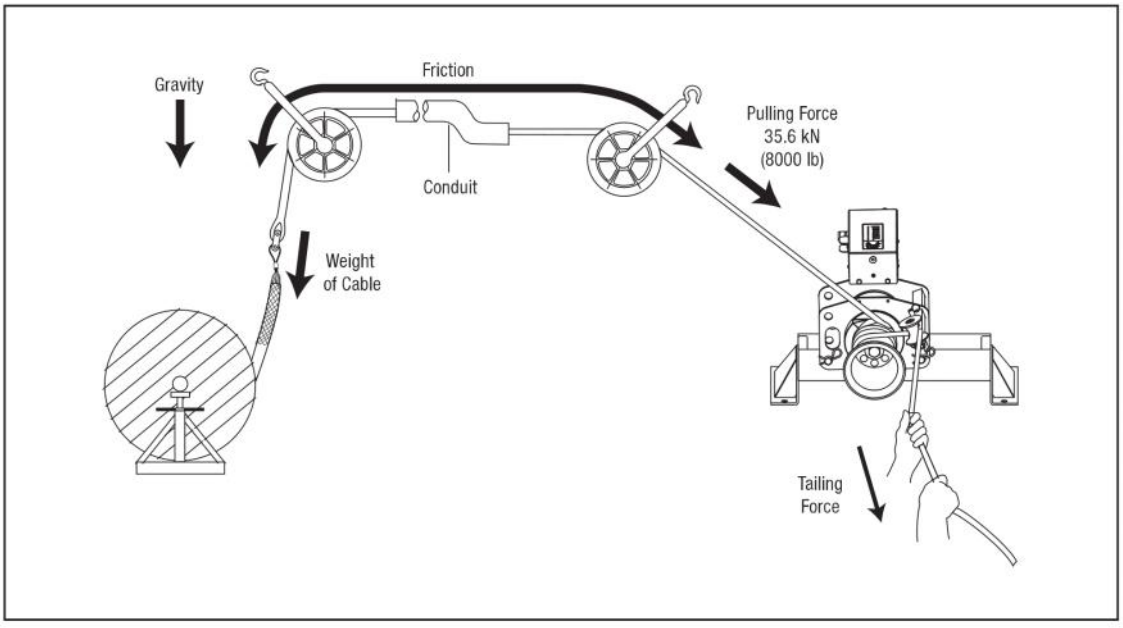
Gravity constantly exerts its force on the vertical portions of the run. When the pulling force is relaxed, gravity attempts to pull the cable downward. Friction develops where the cable contacts the sheaves, conduit, and tray. Friction resists any movement, forward or backward, and tends to hold the cables in place.

To accomplish a cable pull, the cable pulling system must develop more force than the combination of gravity and friction.

Generating Pulling Force

To generate pulling force, the capstan works as a *force multiplier*. The operator exerts a small amount of force on the rope. The cable puller multiplies this and generates the pulling force.

This pulling force is applied to the rope, connectors, and cable in order to accomplish the pull. The direction of force is changed, where necessary, with pulling sheaves.



Cable Pulling Theory Illustrated

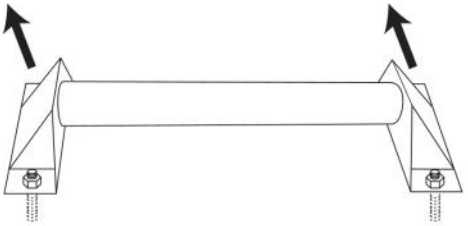
Cable Pulling Principles (cont'd)

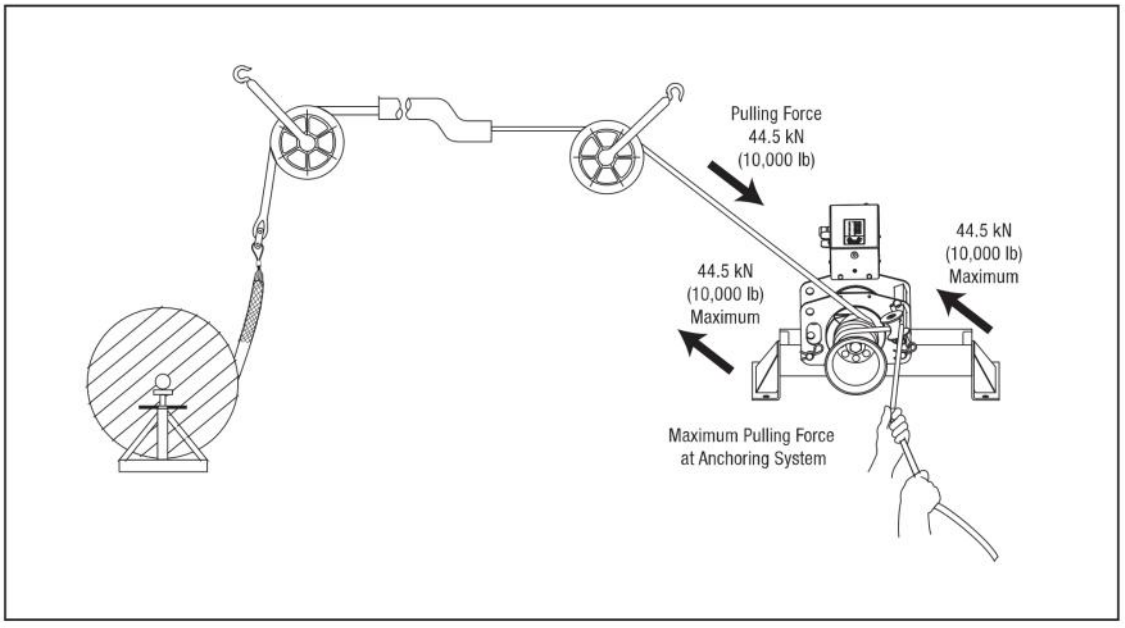
Cable Pulling Forces

This section provides detailed explanations and illustrations of the forces that are generated during the cable pull. These explanations are based on the concepts presented in the last section, "Pulling Theory."

At the Cable Puller Anchoring System

The cable puller will exert its maximum pulling force on cable puller's anchoring system. It is extremely important the anchoring system can withstand this amount of force. Refer to the instruction manual provided with your anchoring system for proper setup or installation.





Pulling Force at the Cable Puller's Anchoring System

Cable Pulling Principles (cont'd)

Cable Pulling Forces (cont'd)

At the Capstan

The capstan acts as a *force multiplier*. The operator exerts a small amount of tension, or tailing force, on the rope; the capstan multiplies this force to pull the cable. The resultant force depends upon the number of times the rope is wrapped around the capstan, as shown in the formula below.

Pulling Force = Tailing Force x $e^{0.0175\mu\phi}$

Where:

e = the natural logarithm, or 2.7183

μ = the coefficient of friction between the rope and the capstan*

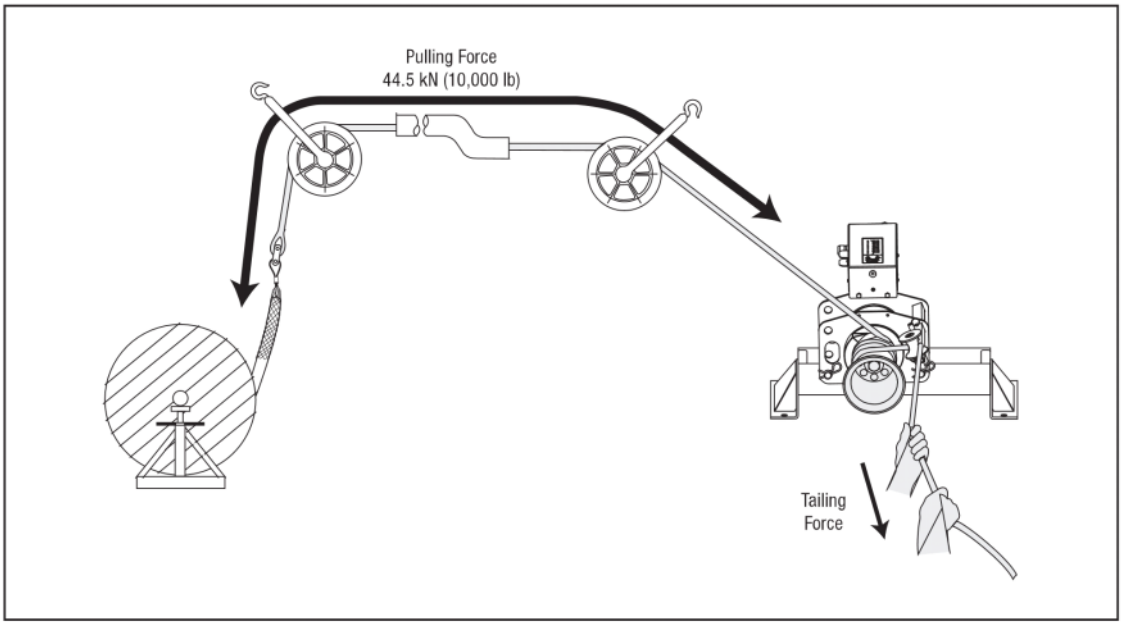
ϕ = the number of degrees of wrap of rope around the capstan

* The average value for the coefficient of friction when double-braided composite rope is pulled over a clean dry capstan is 0.125.

The following table is based on the formula above. The input, or tailing force, is constant at 44.5 N (10 lb). Increasing the number of wraps increases the pulling force.

Operator's Tailing Force	Number of Wraps of Rope	Approximate Pulling Force
44.5 N (10 lb)	1	93.4 N (21 lb)
	2	213.5 N (48 lb)
	3	474.9 N (106 lb)
	4	1043.8 N (233 lb)
	5	2293.7 N (512 lb)
	6	5048.9 N (1127 lb)
	7	11.1 kN (2478 lb)

This table shows how the capstan acts as a force multiplier. Because the coefficient of friction depends upon the condition of the rope and capstan, this formula cannot determine an exact amount of pulling force.



The Capstan as a Force Multiplier

Cable Pulling Principles (cont'd)

Cable Pulling Forces (cont'd)

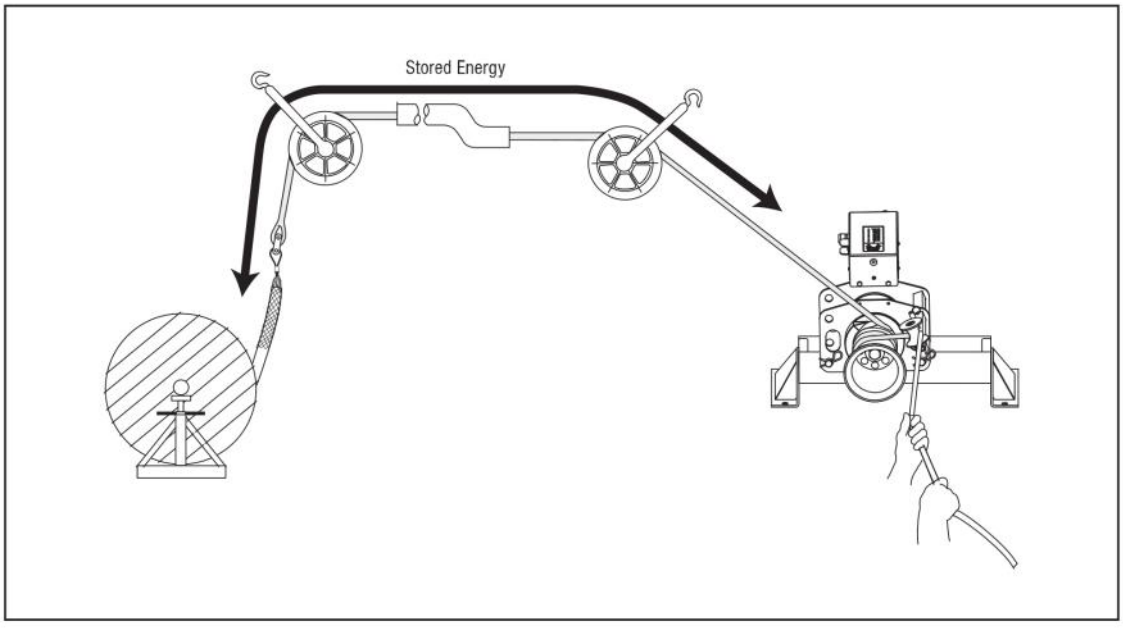
At the Pulling Rope

The product of a force (f) moving through a distance (d) is energy (f x d), and may be measured in newton-meters or ft-lb. Energy is stored in a rope when the rope is stretched. This is similar to the way energy is stored in a rubber band when it is stretched. Failure of the rope or any other component of the pulling system can cause a sudden uncontrolled release of the energy stored in the rope.

For example, a 100 meter nylon rope with a 50,000 newton average breaking strength could stretch 40 meters and store 1,000,000 joules of energy. This is enough energy to throw a 900 kilogram object, such as a small automobile, 113 meters into the air.

A similar double-braided composite rope could store approximately 300,000 joules of energy. This could throw the same object only 34 meters into the air. The double-braided composite rope stores much less energy and has much less potential for injury if it were to break.

Double-braided composite rope is the only type of rope recommended for use with the UT10 cable puller. Select a double-braided composite rope with an average rated breaking strength of at least 143 kN (32,000 lb).



Stored Energy

Cable Pulling Principles (cont'd)

Cable Pulling Forces (cont'd)

At the Connectors

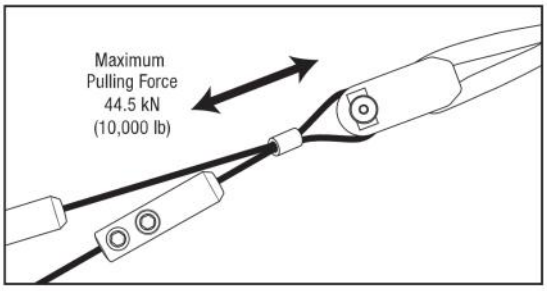
The connectors will be subjected to the cable puller's maximum pulling force.

Several types of rope connectors—clevises, swivels, and rope-to-swivel connectors—are available. Follow the instructions provided with each to provide a good connection.

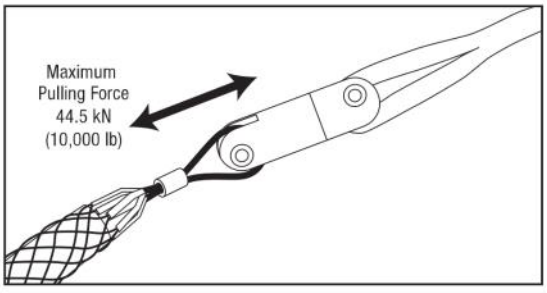
Two types of wire connectors—wire grips and pulling grips—are available. The wire grip uses a set screw to clamp onto the conductors of the cable. The pulling grip consists of a wire mesh basket that slides over the cable and grips the insulation.

When selecting a pulling grip, it is extremely important to select a grip of the correct (1) type, (2) size, and (3) maximum rated capacity.

1. Select the correct type based on the descriptions of each type in the Greenlee catalog.
2. Measure the circumference of the wire bundle. (To do this accurately, fasten a tie strap around the bundle. Cut off and discard the tail. Then cut the tie strap and measure its length.). Use the table provided to find the correct size.
3. Refer to the maximum rated capacities in the Greenlee catalog.



A Typical Grip Setup—Clevis and Wire Grip



A Typical Grip Setup—Swivel and Pulling Grip

Pulling Grip Size Table

Circumference Range		Required Grip Diameter	
inches	mm	inches	mm
1.57–1.95	39.9–49.5	0.50–0.61	12.7–15.5
1.95–2.36	49.5–59.9	0.62–0.74	15.8–18.8
2.36–3.14	59.9–79.8	0.75–0.99	19.1–25.1
3.14–3.93	79.8–99.8	1.00–1.24	25.4–31.5
3.93–4.71	99.8–119.6	1.25–1.49	31.8–37.8
4.71–5.50	119.6–139.7	1.50–1.74	38.1–44.2
5.50–6.28	139.7–159.5	1.75–1.99	44.5–50.5
6.28–7.85	159.5–199.4	2.00–2.49	50.8–63.2
7.85–9.42	199.4–239.3	2.50–2.99	63.5–75.9
9.42–11.00	239.3–279.4	3.00–3.49	76.2–88.6
11.00–12.57	279.4–319.3	3.50–3.99	88.9–101.3
12.57–14.14	319.3–359.2	4.00–4.49	101.6–114.0
14.14–15.71	359.2–399.0	4.50–4.99	114.3–126.7

Cable Pulling Principles (cont'd)

Cable Pulling Forces (cont'd)

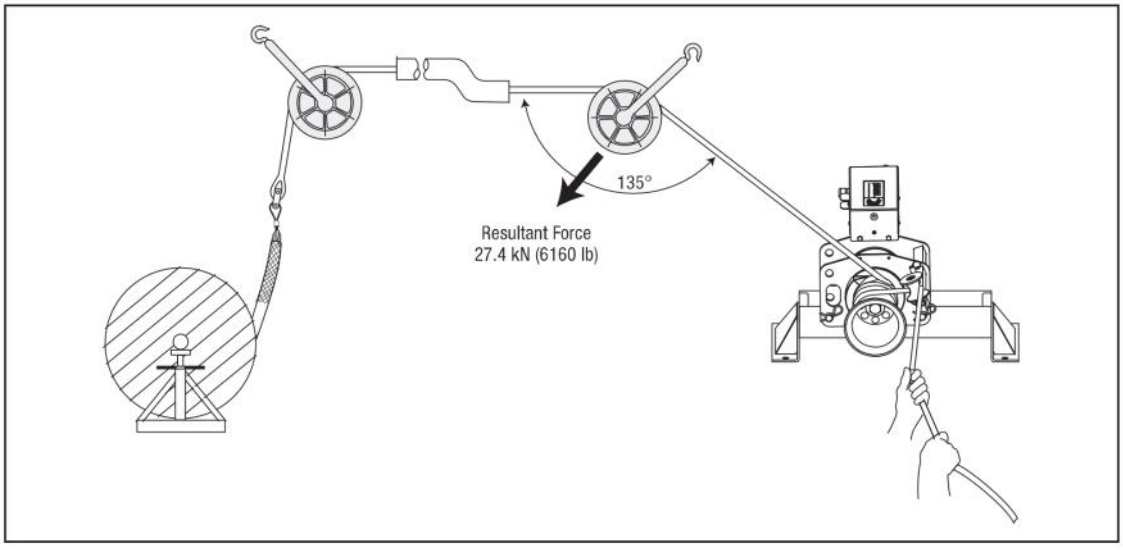
At the Sheaves

Sheaves are used to change the direction of the pull. A change in direction creates a new *resultant force* that may be greater than the cable puller's maximum pulling force. This new *resultant force* exerts itself on the sheaves, sheave anchoring system, and support structures illustrated.

The resultant amount of force depends on the angle of the change in direction. A brief table is provided here; For details on calculating the resultant force for any angle, refer to IM 1363 (99929988).

Resultant Force Table
(35.6 kN or 8,000 lb Pulling Force)

Illustration	Angle of Change in Direction	Resultant Force in kN (lb)
	180°	0 (0)
	150°	18.5 (4160)
	135°	27.4 (6160)
	120°	35.6 (8000)
	90°	50.2 (11,300)
	60°	61.6 (13,800)
	45°	65.8 (14,800)
	30°	68.7 (15,400)
	0°	71.2 (16,000)



Typical Resultant Force at Sheave

Cable Pulling Principles (cont'd)

Tailing the Rope

The rope must be pulled off of the capstan as the pull progresses. The rope that has left the capstan is the "tail." The process of pulling the rope off of the capstan is called *tailing the rope*.

The resistance of the cable varies throughout the duration of the cable pull. Changes in resistance are due to characteristics of the rope, changes in conduit direction, and changes in the amount of friction. The "feel" of the rope provides this information about the pull. This is called *tactile feedback*. Adjust the tailing force as necessary to compensate for these changes.

Control of the Pull

Decreasing the tailing force will decrease the pulling force, until the rope slips on the capstan and the pull stops. This provides a high level of control over the progress of the cable pull.

Do not allow the rope to slip on the capstan for more than a few moments. If it becomes necessary to completely stop a pull, shut off the puller and maintain enough tailing force to hold cable in place. Tie the rope off to hold it in place.

Amount of Tailing Force

While the rope and cable are under tension, it is important to maintain the proper amount of tailing force.

Too little tailing force will allow the rope to slip on the capstan. This will build up excessive heat and accelerate rope wear, increasing the possibility of breaking the rope.

The proper amount of tailing force will stop the rope from slipping on the capstan and produce a sufficient amount of pulling force to pull in the rope and cable.

Too much tailing force is any amount more than is necessary to stop the rope from slipping on the capstan. Excessive tailing force will not increase the pulling force or pulling speed.

Number of Wraps of Rope Around the Capstan

An experienced operator should choose the number times the rope is wrapped around the capstan.

The proper number of wraps allows the operator to control the progress of the pull with a comfortable amount of effort.

Using *too few* wraps requires a large tailing force to accomplish the pull. Using too few wraps also makes the rope more likely to slip on the capstan. This builds up heat and accelerates rope wear.

Using *too many* wraps causes the rope to grab the capstan tighter. This accelerates rope wear, wastes power, and increases the possibility of a rope overlap. Using too many wraps also reduces tactile feedback, so you receive less information about the pull. You cannot quickly relax the tailing force when there are too many wraps.

If the rope becomes difficult to tail, add another wrap of rope. Turn off the puller and release all of the tension in the rope. Add a wrap and resume pulling. Be aware, however, that some pulls will require tension to hold the cables in place. In these cases, do not attempt to release all of the tension and add a wrap of rope. You will need to anticipate the number of wraps before starting the pull.

Preventing Rope Overlap

Do not allow the rope to become overlapped on the capstan during a pull.

A rope overlap will make it impossible to continue or back out of the pull.

If the rope becomes overlapped, you will lose control of the pull—the rope will advance with no tailing force and will not feed off of the capstan. The capstan will not allow you to reverse the direction of the rope, so you cannot back out of an overlap.

Set up the puller properly. The rope ramp and tapered capstan are intended to prevent rope overlap. Refer to the instructions in the "Operation" section of this manual.

Every wrap of the rope must remain in direct contact with the capstan. During the pull, take great care to prevent the incoming rope from riding up and overlapping the next wrap. If an overlap begins to develop, immediately relax the tailing force on the rope so that the rope can feed back toward the conduit or tray. When the rope resumes its normal path, apply tailing force and continue the pull.

There is no suggested remedy for a rope overlap. **Do not allow the rope to overlap!**

Cable Pulling Principles (cont'd)

Summary of Cable Pulling Principles

- A cable pulling system consists of many components that work together to accomplish a pull.
- The cable puller is rated by its maximum pulling force; every other component is rated by its maximum rated capacity. The maximum rated capacity of every component must meet or exceed the maximum pulling force of the cable puller.
- The cable puller must overcome two types of resistance: gravity and friction. The puller's capstan, the pulling rope, and the operator tailing the rope work together to produce pulling force.
- The cable puller exerts force on every component of the cable pulling system, including the anchoring systems and the support structures.
- Energy is stored in a rope when the load causes the rope to stretch. Failure of the rope or any other component can cause a sudden release of energy. Replace any rope that is worn or damaged.
- Carefully select the number or wraps of rope around the capstan before starting the pull.
- Control the pull by tailing the rope. Be familiar with the interaction of the rope and capstan.
- Do not allow a rope overlap to develop.

Planning the Pull

- Pull in a direction that will require the lowest amount of pulling force.
- Plan several shorter pulls rather than fewer longer pulls.
- Locate the puller as close to the end of the conduit as possible to minimize the amount of exposed rope under tension.
- Place each component so that the pulling forces are used effectively.
- Select an anchoring system: adapter sheaves, which are preferred, or the floor mount.
- Verify that each component has the proper load rating.
- Inspect the structural supports. Verify that they have enough strength to withstand the maximum forces that may be generated.

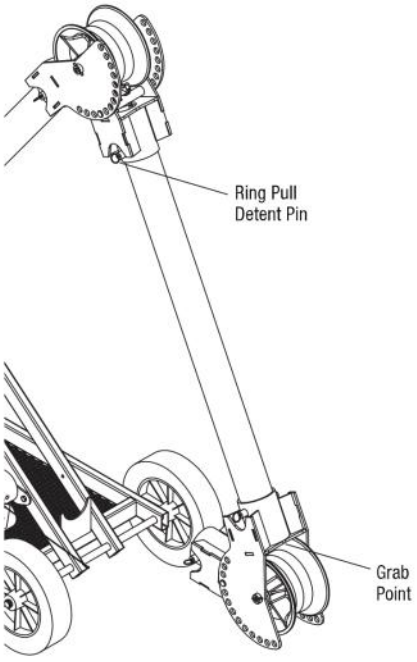
ASSEMBLY

Boom Assembly/Disassembly

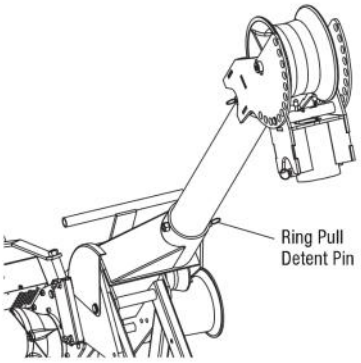
Under normal circumstances, there is no need to disassemble the boom assembly. However, it can be disassembled in order to fit into a small truck, mount the puller head remotely on a floor mount, alter the boom lengths, etc.

To disassemble, follow this procedure:

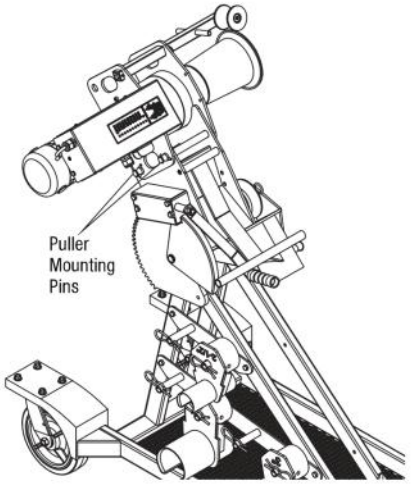
1. Lock the swivel caster brakes.
2. Pivot the elbow until the forward boom is clear of the carriage.
3. Grab the nose by the hole at the end of the boom tube, and lift up to relieve the preload on the detent pins.



4. Pull out on the detent ring that locks the boom tube, and twist the nose slightly so the hole in the boom tube and detent pin are misaligned.



5. Release the detent ring, and pull the nose and forward boom from the elbow.
6. Repeat this process to remove the back boom and elbow. Raise or lower the boom(s) as desired beforehand to gain a comfortable position.
7. Turn the crank clockwise until the puller head is as high as it will go.
8. Remove the clips and pull out the pins that mount the puller head.



9. Lift the puller head off the boom mount using as many people as needed to lift 45 kg (100 lb).

Aside from detaching the other end of the two boom tubes, this is as far as the unit breaks down. Assemble in the reverse order, making sure that all detent pins are fully seated before releasing your hold.

Boom Setup

Up Pull Starting from Teepee Position

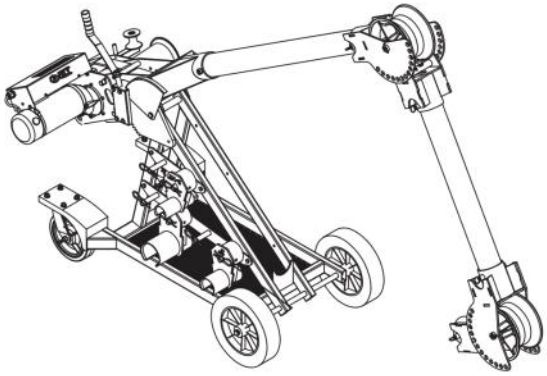
1. Set the brakes.
2. Raise the forward boom as described under "Boom Operation" until it is close to the angle desired for the pull setup,

   or

   a. Lock the elbow detent pins in the fully inward position.

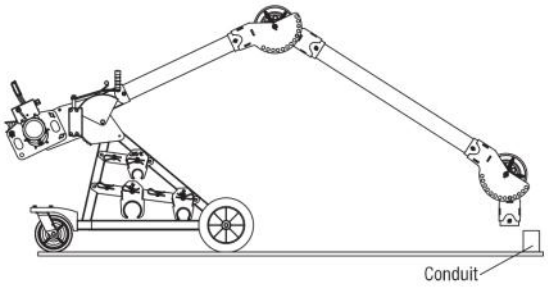
   b. Lower the boom (turn crank CW) until the nose hits the floor.

   c. Release the brakes and continue to lower the boom while walking the carriage backwards until the elbow is at the desired angle and lock it in place.



Position Elbow to Desired Angle

3. Raise or lower the boom until the nose is just above the conduit to be pulled from.



Position Nose Higher than Conduit

To use slip-in couplings:

a. Insert the appropriate slip-in conduit adapter coupling into the nose.

b. Pivot the nose until the coupling is aligned with the conduit and lock in position.

c. Raise the boom until the bottom of the coupling clears the conduit.

d. Release the brakes if not already released.

e. Roll the carriage forward until the coupling is over the conduit and lower it into the conduit.

To use screw-on couplings:

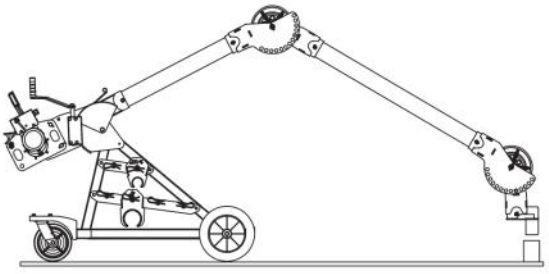
a. Screw the appropriate screw-on adapter coupling fully onto the conduit.

b. Pivot the nose until it is aligned with the coupling and lock in position.

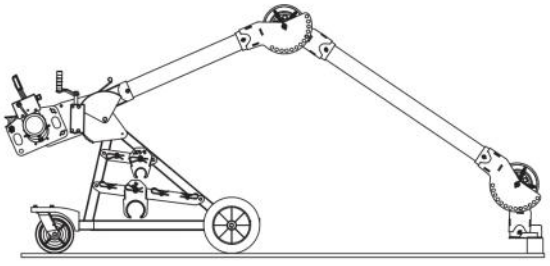
c. Raise the boom until the bottom of the coupling clears the conduit.

d. Release the brakes if not already released.

e. Roll the carriage forward until the nose is over the coupling, pull the detent ring, and lower the nose onto the coupling.



Insert Conduit Adapter and Raise above Conduit

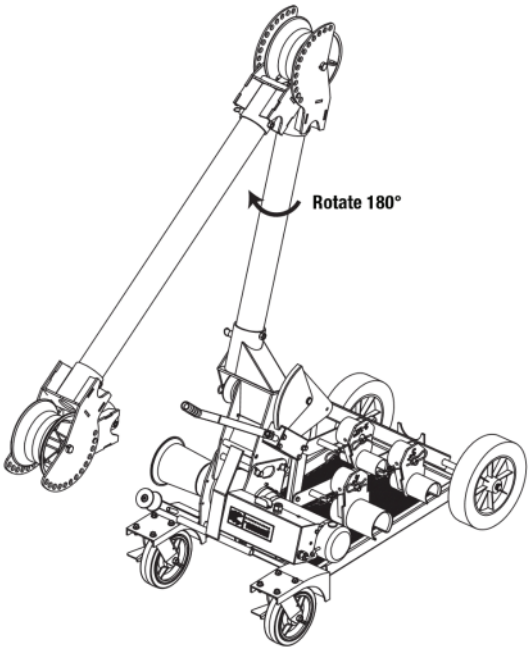


Lower into Conduit

Boom Setup (cont'd)

Down Pull Starting from Teepee Position

1. Set the brakes.
2. Pivot the elbow one or two detent positions outward. Lift up on the nose to release any preload on the detent pin securing the back boom to the elbow.
3. While holding the detent out, rotate the elbow on the back boom 180° by walking it around the carriage.



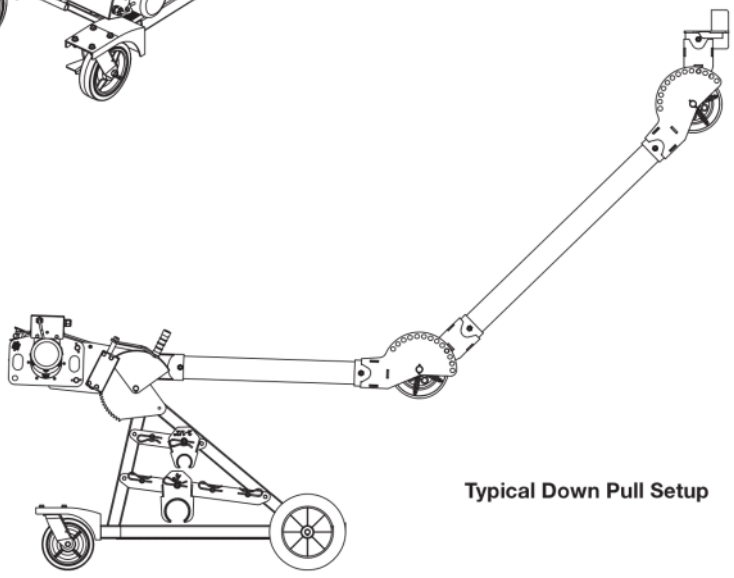
4. Lower the entire boom until the forward boom is close to vertical.
5. Lower the forward boom until the elbow is close to the angle desired for the pull setup.
6. Raise or lower the boom until the nose is just below the conduit to be pulled from.

To use slip-in couplings:

a. Insert the appropriate slip-in conduit adapter coupling into the nose.
b. Pivot the nose until the coupling is aligned with the conduit and lock in position.
c. Lower the boom until the coupling clears the conduit.
d. Release the brakes.
e. Roll the carriage forward until the coupling is under the conduit and raise it.

To use screw-on couplings:

a. Screw the appropriate screw-on adapter coupling fully onto the conduit.
b. Pivot the nose until it is aligned with the coupling and lock in position.
c. Lower the boom until the coupling clears the conduit.
d. Release the brakes.
e. Roll the carriage forward until the nose is under the coupling, pull the detent ring, and raise the nose onto the coupling.



Typical Down Pull Setup

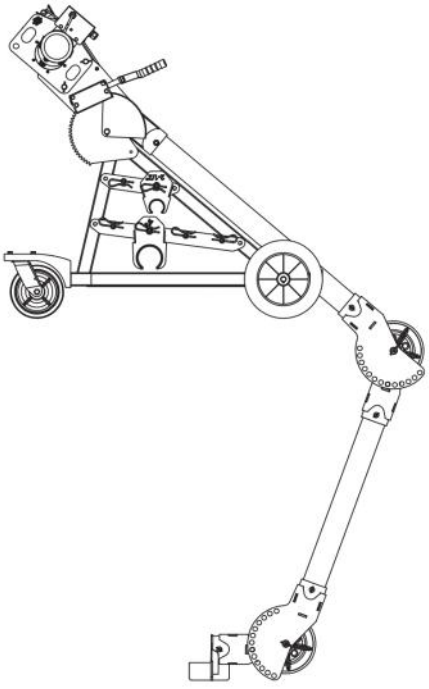
Boom Setup (cont'd)

Horizontal Pull

Horizontal pulls are essentially the same as an up pull or a down pull.

- If the conduit is above the puller, follow the up pull instructions.
- If the conduit is below the puller, follow the down pull instructions.

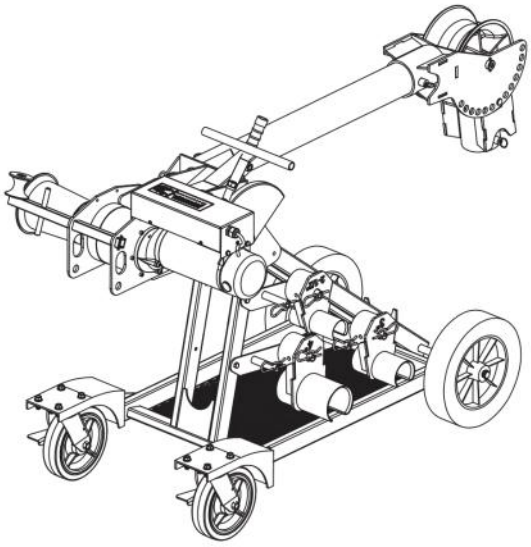
The only difference is in the horizontal alignment of the coupling with the conduit and using the carriage to walk the coupling into the conduit (or the nose into the coupling for the screw-on adapters).



Horizontal Pull in Underground Vault

Single Boom Pull

All of the previous boom setup instructions assume that two booms are used. While using two booms can be useful for working around obstructions, keeping angles over sheaves to a minimum, and pulling out extra tail, it is not always necessary. A single 3', 4', or 3" rigid conduit up to 10' long can be used to keep setups even simpler.



Single Boom Setup

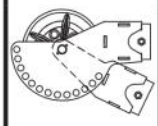
Boom Setup (cont'd)

Boom Components

⚠WARNING

- Use only Greenlee supplied booms or straight 3" diameter rigid steel conduit or Schedule 40 steel pipe for the boom tubes.
- Do not use boom tubes longer than 3 meters (10'). Longer booms may bend or break.

Failure to observe this warning could result in severe injury or death.



⚠WARNING

If the elbow/nose unit is disassembled, reassemble unit as shown. Improper setup will cause the elbow unit to collapse.

Failure to observe this warning could result in severe injury or death.

⚠WARNING

Shear point:

Never put fingers through holes in boom components. Pivoting of mating arts may cut off fingers. Always keep elbow unit locked with pivot pin except while adjusting.

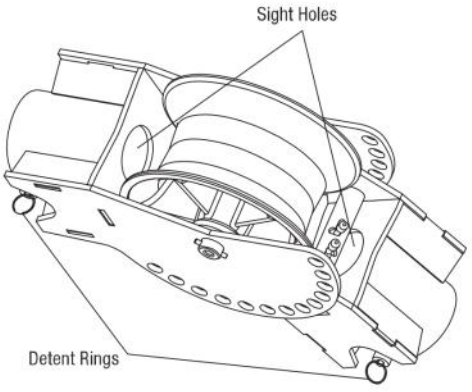
Failure to observe this warning could result in severe injury or death.

Use these boom tubes only:

- Boom tubes supplied with the UT10
- 3" rigid steel conduit (3 m or 10' maximum)
- 3" Schedule 40 pipe (3 m or 10' maximum)

If using 3" rigid conduit in place of the standard booms:

1. Insert the conduit while pulling out the detent rings.
2. Slide the conduit fully in and verify it is seated through the sight holes.
3. Use 1/2"-13 screws (not supplied) in the weld nuts to lock the conduit in place.

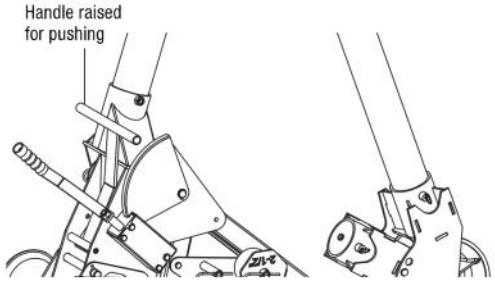


Transporting the Boom

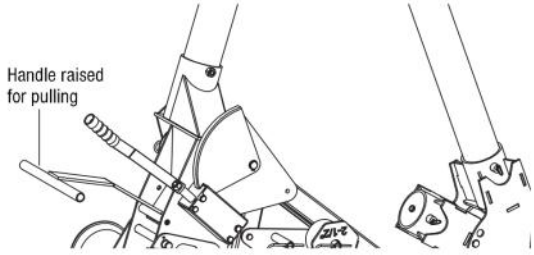
Wheeling

1. **If the unit had been set up for an up pull:**
   a. Lower the nose to the floor to get to the Teepee transport position.
   b. Lock the elbow pivot detents in the inward position.
   c. Raise the boom by cranking until the nose is off the floor, and release the detents.

   If the unit had been set up for a down pull:
   a. Release the elbow pivot detents, fold the forward boom back to the next to last position, and lock the elbow.
   b. Raise the boom all the way up until it hits the stop.
   c. Release the ring pull detent that locks the back boom to the elbow, and rotate the elbow 180° into its Teepee position.
2. Lift the push/pull handle up until it contacts the boom mount to push the carriage. Use the same handle to pull the unit.



Handle Position for Pushing

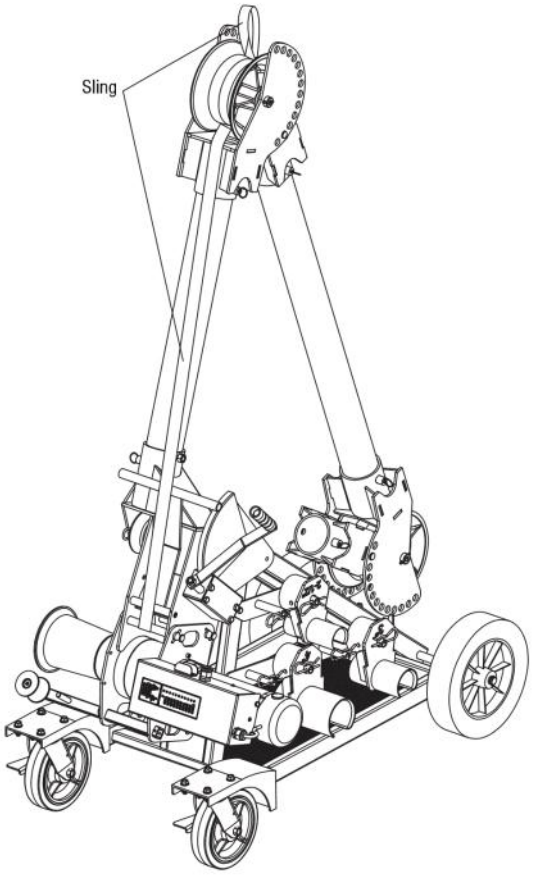


Handle Position for Pulling

3. Fold the handle down on top of the puller head when not in use to keep it out of the way.

Lifting

1. Connect a lifting sling to the top puller head mounting pin.
2. Feed the sling up between the sheave and frame of the elbow so that it is trapped.
3. Lift the sling from above the elbow.

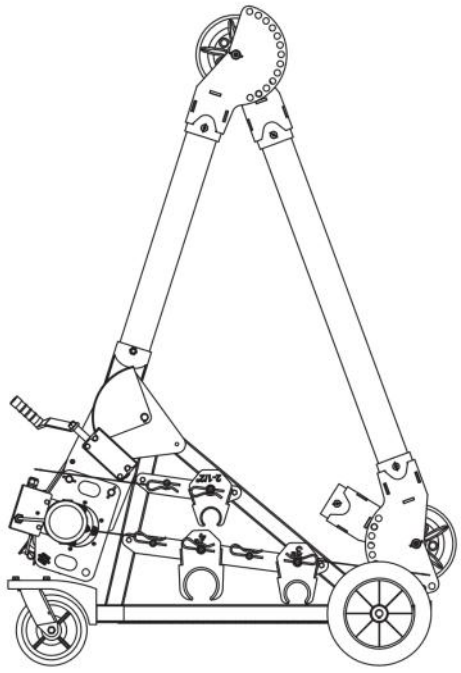


OPERATION

Boom Operation

Raising and Lowering

The boom can be raised and lowered using the crank in front of the puller. Turn the crank counterclockwise to raise the boom, and clockwise to lower it. When starting from the Teepee position, unlock the elbow before lowering to prevent the boom from crashing against the carriage.



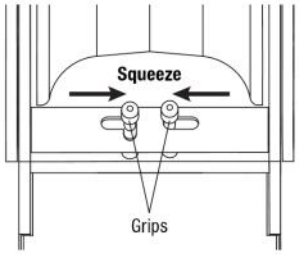
Teepee Position

Pivoting the Elbow and Nose Units

The elbow and nose units are physically identical and can be used interchangeably. For the sake of clarity, in this manual:

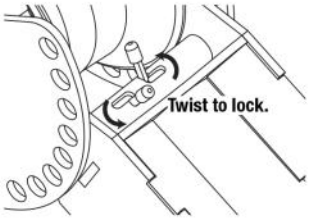
- "Nose" refers to the unit that attaches to the conduit via couplers.
- "Elbow" refers to the unit that connects the two boom tubes.

The elbow/nose units pivot and lock at various degrees of rotation. They are locked in place by a detent pin set located between the sheave and the end of the boom tube receptacle. To pivot, squeeze the grips on the detent pins fully inward.



Make sure the detent pins on both sides are fully retracted before trying to pivot. Release the grips when the desired pivot angle is reached, and pivot slightly more to allow both detents to engage in the closest holes.

When the detent pins are squeezed to the fully inward position, they can be locked in place by twisting them counterclockwise.



Never pull cable with the detent pins locked inward; both the elbow and nose must be locked from pivoting before pulling.

Boom Operation (cont'd)

Boom Tubes

The pulling system comes standard with a 4' and 3' long boom. The default setup is with the 3' boom between the puller and elbow, and the 4' tube between the elbow and nose. This setup can be reversed at the user's discretion. The boom tubes are held in place by detent pins with pull rings.

In addition, 3" rigid conduit up to 10' long can be substituted for either or both of the boom tubes. If 3" rigid conduit is used, two conditions must be accounted for:

- Because the detents will not hold the conduit in place in the receptacles, the conduit must be clamped in place opposite the detent pins using 1/2"-13 screws (not supplied).
- Because the weight will be too great to use the crank to raise and lower the boom, manual assist is required.

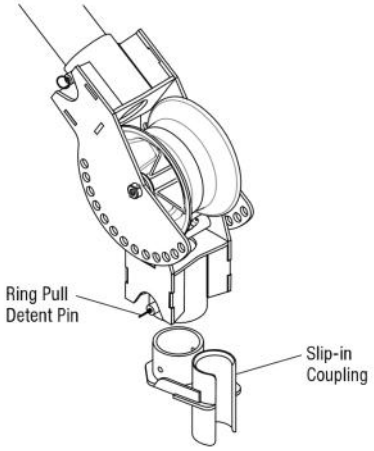
Conduit Adapter Couplings

Couplings to attach the puller system to the conduit are available in 2", 2-1/2", 3", 3-1/2", 4", and 5" sizes.

There are two types: slip-in and screw-on:

- Slip-in couplings are the easiest to use but do intrude on the ID of the conduit.
- Screw-on couplings do not decrease the effective ID of the conduit, but take longer to set up.

If longer than standard booms are being used, screw-on couplings may be necessary to support the boom and prevent it from falling. The conduit adapter couplings fit into the same receptacles as the boom tubes and are retained by the same ring pull detent pins.

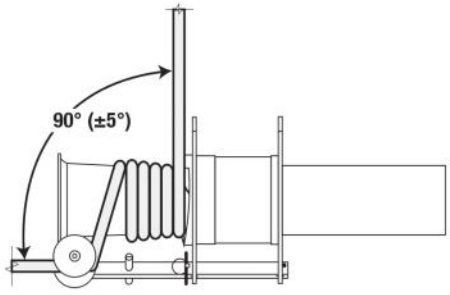


Puller Operation

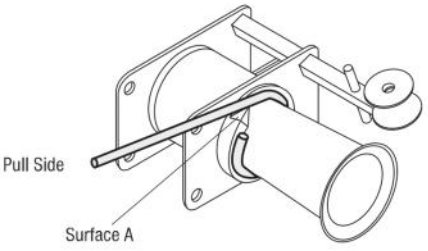
1. Fish the rope through the conduit.
2. Set up the cable puller. Refer to the illustrations and instructions in the "Typical Setups" section.

⚠WARNING

Set up the cable puller so that the rope will approach the capstan at an angle of 90° (±5°). Angles outside of this range may cause the rope to overlap.



3. Set the rope ramp as follows:



   a. Wind the rope several times around the capstan.
   b. Pull the ramp away from the mounting plate and rotate it until Surface A contacts the rope.
   c. Push the ramp toward the mounting plate and rotate it counterclockwise until it locks into place.
4. Plug the puller into a 20 amp grounded outlet. Turn on the switch/circuit breaker.
5. The lights will cycle through a power up sequence with only the "0" light remaining lit. The default startup speed is high. The high speed light will be lit. To change the speed to low, double tap the foot switch. The low speed light will illuminate. Double tap the foot switch again to change back to high speed.
6. After the foot switch is depressed, the green light indicating 0 lb will be lit. As the force climbs, an additional light illuminates for every 1000 lb increase in pulling force.
   - If the continuous operating limit of the puller is exceeded in high speed mode, the green lights start to flash.
   - If the continuous operating limit of the puller is exceeded in low speed mode, the yellow lights illuminate.
   - The red light illuminates at 10,000 lb to indicate that the maximum operating limit of the puller has been reached. The circuit breaker (or current limiting) may shut down the puller before or shortly after the red light illuminates.
7. Make sure all nearby personnel are not standing in line with or close to the pull rope. The right angle sheave on the UT10 should be used to allow the operator to stand off to the side as required.
8. Position yourself so that you can see the force gauge indicator lights. Refer to the table below.

Force Gauge Indicator Lights

State of Force Lights	Pulling Force (lb)	Duty Cycle
Green	0–6500 (low)	Continuous
	0–3250 (high)	
Green flashing	3250–4000 (high)	15 ON/15 OFF
Yellow	6500–8000 (low)	15 ON/ change to low
Red	Over 8000	STOP

9. Grasp the tailing end of the rope. Apply a slight amount of tailing force.
10. Start the puller by pressing and holding down the foot switch.
11. Tail the rope, allowing the spent rope to accumulate on the floor between the operator and the puller.
12. When the pull is complete, turn the puller OFF. Tie off the rope and anchor the cable.

Removing Cable

Removing old cable involves the same principles as installing new cable. However, there are some important differences.

Pulling Force

It is difficult to predict the amount of pulling force necessary to remove an old cable. The cable may be damaged, and it may break with an unexpectedly low pulling force.

The required pulling forces may be very high:

- The cable has probably "taken a set." Unlike the new cable on a reel, cable in conduit has probably been in the conduit for years, or perhaps decades. The cable will resist bending and straightening as it is pulled through the conduit.
- The pulling lubricant has probably hardened, increasing pulling resistance.
- The insulation may be damaged and the cable may be corroded.
- Dirt or other foreign matter may have entered the conduit and may have cemented the cable in place.

Puller Placement

Pulling out old cable is generally accomplished with the puller located some distance away from the end of the conduit. This allows the pulling crew to pull out a long section of cable before turning off the puller, cutting off the cable, and reattaching the grip(s). Mounting the cable puller a distance away from the end of the conduit increases the amount of exposed rope, which greatly increases the amount of violent whipping action which would occur if the rope were to break.

To isolate the operator from the rope path:

- Locate the puller so that you will stand behind an obstruction, such as a wall. Set up the puller so that you will be able to maintain control of the pull. You need a clear view of the rope as it feeds onto the capstan, including several feet of the rope in front of the capstan. You must be able to turn off the puller before the pulling grip, connector, or swivel contacts the capstan.
- Use an additional pulling sheave (if necessary) to change the direction of the tailing rope. Anchor the sheave so that you are close enough to maintain control of the pull. You need a clear view of the rope as it feeds onto the capstan, including several feet of the rope in front of the capstan. You must be able to turn off the puller before the pulling grip, connector, or swivel contacts the capstan.

  Note: Use the additional pulling sheave to change the direction of the tailing rope (after the rope leaves the capstan). Do not change the direction of the pulling rope.
- Use a longer tailing rope than usual and stand away from the puller. Stand as far from the puller as possible, while maintaining control of the pull. You need a clear view of the rope as it feeds onto the capstan, including several feet of the rope in front of the capstan. You must be able to turn off the puller before the pulling grip, connector, or swivel contacts the capstan.

SERVICE

Tool service must be performed only by qualified repair personnel. Service or maintenance performed by unqualified personnel could result in a risk of injury.

When servicing a tool, use only identical replacement parts. Follow instructions in the "Maintenance" section of this manual. Use of unauthorized parts or failure to follow maintenance instructions may create a risk of electric shock or injury.

Maintenance

IMPORTANT

Maintenance should be performed by authorized personnel only.

General Maintenance Notes

- Replace any part that is broken, cracked, or worn.
- Replace any bearings that don't turn freely.
- Clean all mating surfaces before assembly.
- Replace gearbox grease with Sentinel SL-WPG or equivalent.

Specific Service Notes

- Average brush life for commutator brushes is about 100 hours. Replace brushes if they are shorter than 9.5 mm (3/8").
- Replace rope ramp if it is grooved more than 6.5 mm (1/4").
- Replace the capstan if it is grooved more than 0.15 mm (1/16").
- The puller should not require any lubrication during its normal service life.

Control Box Removal and Disassembly

1. Remove the four hex head cap screws and nuts that secure the clamp to the control box.
2. Loosen the motor and power cord strain reliefs. Remove the six screws securing the cover to the base plate.
3. Disconnect the white and black motor leads from the circuit board.
4. Unscrew the green ground wire from the base plate.
5. Disconnect the ribbon cable.
6. Disconnect the power cord at the circuit board and breaker.
7. Disconnect the foot switch plug.
8. Pull the control unit free.

Switchbox Assembly Notes

1. The ribbon cable has an arrow at the No. 1 pin connection, which goes next to the foot switch receptacle.
2. The foot switch plugs into the receptacle closest to the ribbon cable.
3. The white motor lead connects to the tab closest to the foot switch plug.

IMPORTANT

The first reduction hub will be damaged if the leads are reversed.

Motor Removal

1. Remove the control box.
2. Remove the black commutator brush caps and pull out the commutator brushes.
3. Use a 7/16" socket to remove nuts and washers at rear of motor.
4. Pull the tail housing off the motor.
5. Pull off the magnet housing.
6. Pull out the armature.

Motor Assembly Notes

1. If the armature does not turn freely after installation, the wrong gear teeth were engaged.
2. Hold armature in place when installing the magnet housing.
3. Insert magnet housing roll pin into the recess on the tail housing.

Capstan Removal

1. Use a 1-1/8" socket to remove capstan retaining bolt and washers.
2. Pull the capstan off of the shaft.

   If the capstan is stuck: Pull out the rope ramp. Use two pry bars on opposite sides of the capstan between the gear housing and the capstan.
3. Remove key.
4. Remove rope ramp.

Capstan Assembly Notes

1. Remove oxidation before assembling.
2. **Do not hammer capstan onto shaft.** Use a 65 mm (2-1/2") or longer bolt to draw the capstan onto the shaft.

Maintenance (cont'd)

Right Angle Sheave Bracket Removal

1. Remove detent pin.
2. Slide arm towards motor. Use a small punch to remove the roll pin.
3. Remove bracket.

Gearbox Disassembly

1. Remove control box, motor, capstan, and right angle sheave bracket.
2. Remove the six screws securing the motor mounting plate.
3. Remove the motor mounting plate.
4. Remove the two additional screws still retaining the intermediate housing (one inside and one outside).
5. Remove the intermediate housing.
6. Remove the reversing gear and shaft. Slide the high and low gears off the planetary input shaft.
7. Remove the six screws securing the puller mounting plate.
8. Remove the puller mounting plate and planetary input plate.
9. Remove the 1st reduction sun gear and shaft with bearing from the planetary input plate.
10. Pull out the 1st reduction gear cluster.
11. Pull out the 2nd reduction gear cluster and center shaft.
12. Pull out the output shaft and 3rd reduction cluster.
13. Remove the six screws securing the remaining puller mounting plate.
14. Remove the mounting plate and ring gear.
15. Remove dowels, washers, and keys, as necessary.

Gearbox Assembly Notes

1. Clean all ring mating surfaces. Apply a flange sealant (Loctite® 515 or equivalent) to all ring mating surfaces.
2. Install the mounting plates. When viewed from the motor end, the motor mounting studs should be positioned at 1 and 7 o'clock. The square hole in the mounting plate should be between 10 and 11 o'clock.
3. Position mounting plates so the screw heads on the capstan side fit into the counterbores of the mounting plates.
4. Assemble the high and low speed gears so that they freewheel clockwise and lock counterclockwise as viewed from the motor end.

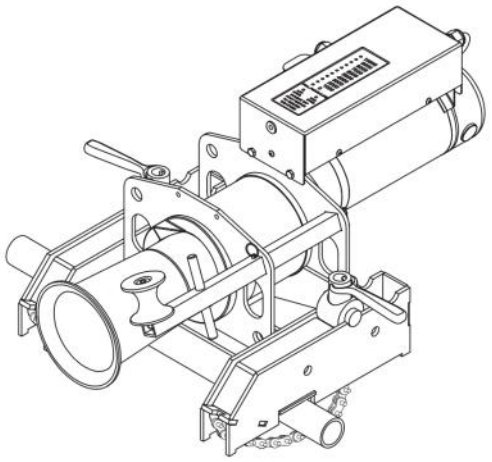
Disassembly of Planet Gear Carriers

1. Remove the flat head screws.
2. Tap or pry off the hub plate from the hub and dowel pins.
3. Remove the thrust washers, gears, thrust washers and shaft.
4. Remove sun gear ONLY if replacement is required.

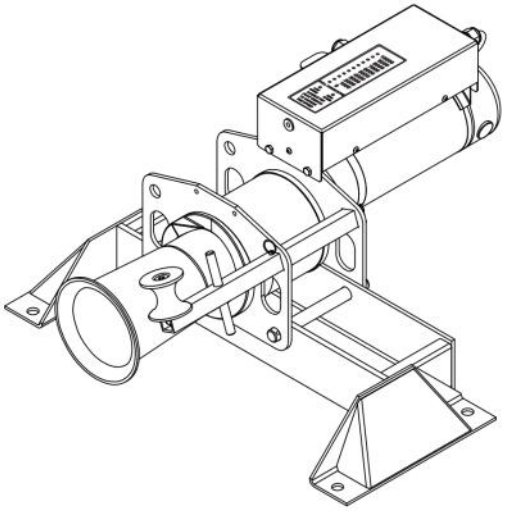
Planet Gear Carrier Assembly

1. Place the shafts in the hub. The end with the flat should face outward.
2. The 1st planet reduction gears must be positioned with the gear end towards the capstan.
3. When replacing the 1st reduction gear bearing/clutch, the locked arrow direction must be counter-clockwise (when viewed from the gear end).
4. **When replacing the ball bearing on the output shaft, the thick side of the outer race must face the capstan.**
5. Use a removable thread-locking compound, such as Loctite® 242® Threadlocker or equivalent, on the #10–32 flat head screws (items 35 and 36 on the gearmotor). Follow the manufacturer's instructions for curing.

ACCESSORIES



Chain Mount—Secured to Steel Conduit or Pipe



Floor Mount—Secured to a Concrete Floor

Setup—Chain Mount

Requires: Exposed metallic conduit with the following characteristics:

- 63.5 mm to 254 mm (2-1/2" to 10") in diameter
- Capable of withstanding at least 44.5 kN (10,000 lb) of force

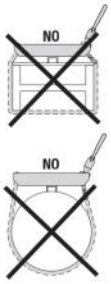
⚠WARNING

Do not mount the chain mount to the following:

- Steel conduit less than 63.5 mm (2-1/2") in diameter
- PVC conduit of any size

These conduits will not support the loads imposed by the puller.

Failure to observe this warning could result in severe injury or death.



⚠WARNING

When setting up the pipe adapter, do not use the vise chains on a structural support that is less than 51 mm (2") or more than 254 mm (10") wide. An oversized or undersized structural support can allow the puller to slide or break loose and strike nearby personnel.

Failure to observe this warning could result in severe injury or death.

⚠WARNING

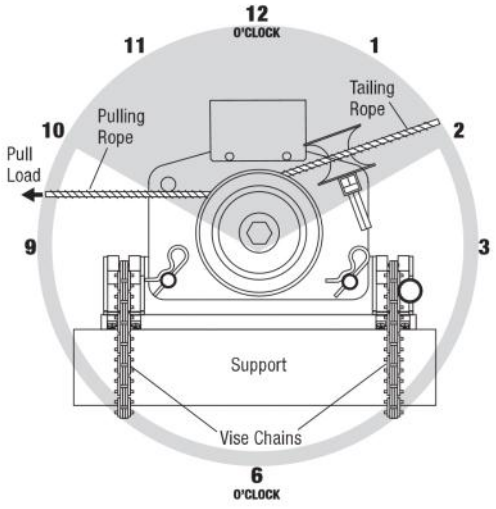
Install the vise chains properly.

- Follow the vise chain tightening instructions carefully. Improperly tightened chains can allow the puller to slide or break loose and strike nearby personnel.
- Do not allow the vise chains to bind at the corners when mounting the puller to a square or rectangular support. The vise chain must be uniformly tight at all points.

Failure to observe this warning could result in severe injury or death.

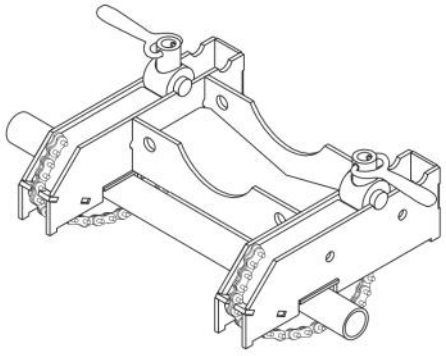
⚠WARNING

Do not pull between the 10 o'clock and 2 o'clock directions. Pulling between 10 o'clock and 2 o'clock could damage the mounting conduit.

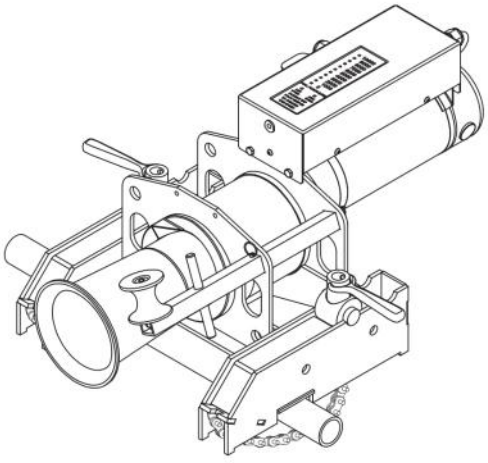


Setup—Chain Mount (cont'd)

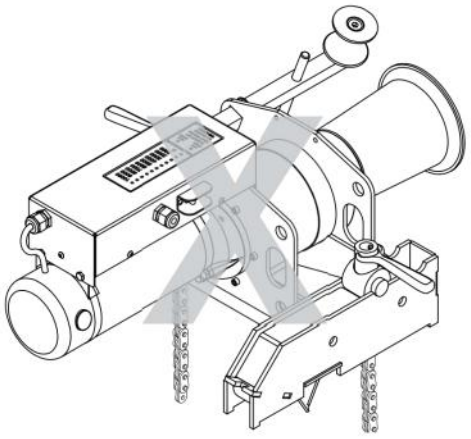
1. On each vise chain unit:
   a. Rotate the vise chain handle counterclockwise to expose most of the threads. Leave only three or four threads engaged in the handle.
   b. Wrap the chain around the conduit.



   c. Pull the vise chain tight and insert the chain pins into the chain pockets, or recesses.
   d. Turn the handle clockwise to tighten the chain. Tighten as much as possible by hand. Do not use a "cheater."
2. Set the puller into the cradle of the chain mount, as shown, so that the inside of the capstan is directly over the mounting.
3. Install two pins from the motor side. Secure the pins with two hitch pin clips.



⚠DANGER



Do not mount puller as shown above.

The chain mount could break away from the mounting, causing severe injury or death.

Setup—Floor Mount

Requires: A concrete floor with the following characteristics:

- Fully cured structural-type concrete
- Minimum compressive strength of 211 kg/cm^2 (3000 psi)
- Free of cracks, crumbling, or patchwork

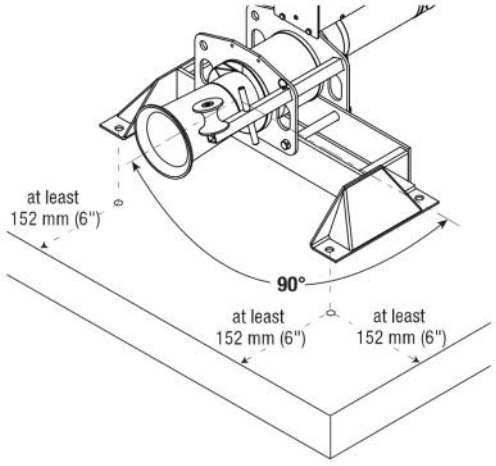
⚠WARNING

Follow all floor mounting instructions carefully.

- An improperly attached floor mount can come loose and strike nearby personnel.
- Do not attach the floor mount to masonry, brick, or cinder block. These materials will not hold the anchors securely.

Failure to observe this warning could result in severe injury or death.

1. Determine the best position for locating the floor mount. Locate the floor mount:
   - on a flat section
   - at least 152 mm (6") from edge of concrete
   - as close to the conduit as possible to reduce the amount of exposed rope under tension
   - so that the pull rope will approach the puller's capstan at a 90° (±5°) angle.



2. Set the floor mount in the desired location. Use the floor mount as a template to drill four 5/8" holes at least 152 mm (6") deep.

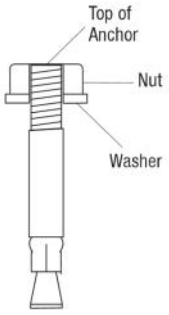
   Note: Use a 5/8" carbide-tipped masonry bit manufactured in accordance with ANSI standard B94.12-77.

3. Vacuum the debris from the holes.

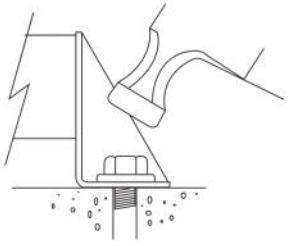
Installation

Greenlee recommends using Greenlee 35607 Wedge Anchors. If another type of anchor is used, they must have an ICBO (International Conference of Building Officials) allowable tension and shear rating of 10.7 kN (2400 lb) in 211 kg/cm2 (3000 psi) concrete.

1. Assemble the nut and washer to the anchor so the top of the nut is flush with the top of the anchor, as shown.



2. Insert the four anchors through the floor mount and into the holes in the floor.
3. Hammer the anchors in until the washer is in firm contact with the floor mount.



4. Expand the anchors by torquing the nuts to 122 to 128 Nm (90 to 95 ft-lb).

⚠WARNING

If any of the four anchors spin before the minimum torque is achieved, abandon the location and start elsewhere. An improperly installed anchor can allow the puller to break loose.

Failure to observe this warning could result in severe injury or death.

5. Have the installation checked by a qualified inspector.