

Pipe Puller

Operator Manual

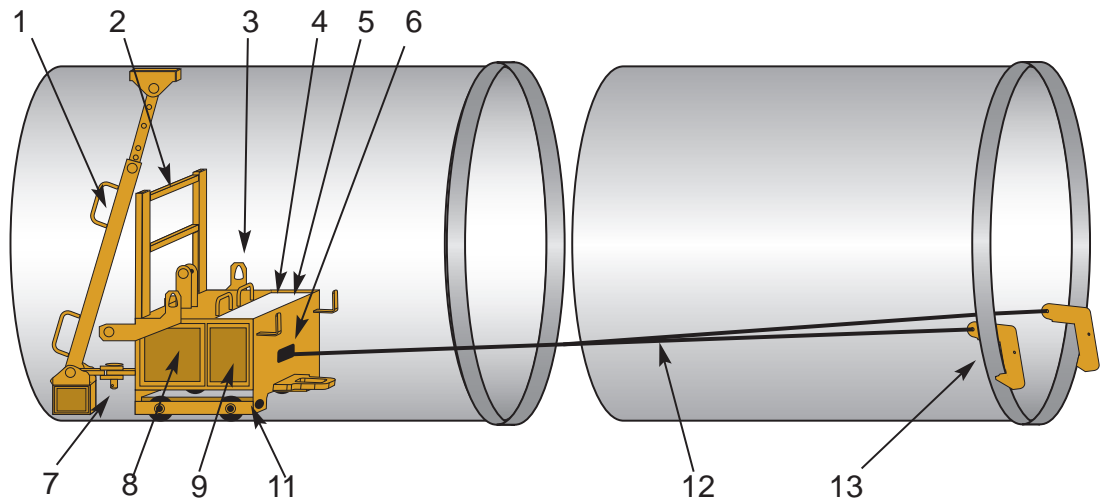
EFFICIENCY
PRODUCTION
America's Trench Box Builder™



Efficiency Production, Inc.

QUICK-JOINT™ PIPE PULLER

An illustration showing the yellow pipe puller machine on the left, pulling a long pipe through a tunnel. The pipe is shown in a perspective view, with the machine's rollers and handle visible on the right side.



FEATURES

- 1. Anchor Legs** - Unit comes complete with standard-duty anchor legs for pulling 42-108 in. pipe. Heavy-duty anchor legs are available for large pipe or box culvert.
- 2. Anchor Guard** - In large diameter pipe or culvert, the anchor guard protects the unit from damage from an unsecured anchor.
- 3. Lifting Eyes** - For easy installation of Pipe Puller into excavation.
- 4. Heat Thermal Protection** - The electric motor on the winch is equipped with a temperature device designed to prevent motor burnout.
- 5. Cable Tension Plate** - A spring-loaded tension plate aids in securing wire rope on drum. Keeping slack out of wire rope adds to the cable's life.
- 6. Free-Spool Winch** - Enables cable to be extended through pipe freely without using battery.
- 7. Anchor Connection** - Secure connector to anchor foot allows for better stability.
- 8. Frame Enclosure** - Metal enclosed sides and hinges protect inner workings from damage.
- 9. Heavy-Duty Winch** - Special electric DC winch enable efficient pulls from longer distances than competitive pullers.
- 11. Pivoting Wheel Carriage** - Enables Pipe Puller to be self-moving. Allows for laser to be shot underneath unit. Fits the curvature of the pipe.
- 12. 100 ft. 7/16 Wire Cable** - Allows you to set several pipe or culvert sections before moving the unit forward. Can be multiple reeved through snatch blocks for the heavier tugs.
- 13. Pulling Hooks** - Heavy-duty steel pulling hooks fit snugly on the bell of the pipe being pulled. For large diameter applications, pulling beams are available in a variety of lengths.

Pin Placement

BASE/SHOE PIN 1"



UPPER SHOE PIN 1"

TUBE PIN 3/4"

BASE/SHOE PIN 1"



ANSI Z535.6-2011

Annex A

Providing Information About Safety Messages in Collateral Materials and Product Safety Signs and Labels

(Informative)

A1 Explanation of signal words and symbols

Signal words and safety symbols that are used in a product's collateral materials or on the product may be defined in collateral materials if space is available.

A1.1 Safety alert symbol

The meaning of the safety alert symbol may be provided in collateral materials. The following artwork may be used for this purpose.



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

A1.2 Signal words

The meaning of the different signal words as defined by the ANSI Z535.6 and ANSI Z535.4 standards may be explained in collateral materials. The following artwork may be used for this purpose.



DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.



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



CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



NOTICE is used to address practices not related to physical injury.



Safety instructions (or equivalent) signs indicate specific safety-related instructions or procedures.

A1.3 Other highlighting conventions

The meaning of any other highlighting conventions used to differentiate safety messages (e.g., text manipulations, indention, etc.) may be explained in collateral materials.

A1.4 Safety symbols

The meaning of any safety symbols used on safety labels or collateral materials may be explained in collateral materials.

A2 Product safety signs and labels

A2.1 Presence, location, and content

Information identifying the presence, location, and content of product safety signs or labels may be provided in collateral materials. Product safety signs may be reproduced in collateral materials. The purpose and expected life of the document, as well as the location and expected life of the labels, should be considered when deciding whether to provide this information. Space considerations in the document may also be considered when deciding whether to include such information.

A2.2 Maintenance or replacement

Information on maintenance and/or replacement of product safety signs and labels may be provided in collateral materials. The expected life of the product, the labels, and the document should be considered when deciding whether to provide this information. Space considerations in the document may also be considered when deciding whether to include such information.

A2.3 References to collateral materials

If product safety signs or labels refer readers to collateral materials for additional safety information, relevant information should be provided in the referenced document(s).

NOTICE

Note: All operators should read & understand the operators manual for the “WARN” SERIES 12 electric winch (supplied by WARN industries)

CONTROL BOX (on 32' Cord)

The Control Box, when engaged in the receptacle is used to power “IN” or power “OUT” wire rope from the winch drum. The push-button switches activate the winch motor. There are two positions on the Control Box, power “IN” or “OUT” as indicated on the Control. The switch must be held in the power positions as the switch is spring-loaded and will automatically return to the “OFF” position. When winch is not in use, disconnect remote Control Box and store in clean and secure area.

CLUTCH OPERATION

The clutch is located on the gear housing. To engage, rotate the clutch lever counter clockwise. To free spool, rotate the clutch lever clockwise. Be certain the indicator is **completely** in the “Engaged” or “Free Spool” positions before using. If the clutch does not engage easily, rotate the drum to align the gears.

OVERLOADING CAUTION

This winch is rated for intermittent duty. It should not be operated with the motor lugged down to a very low RPM. When the motor reaches stall speed, a rapid heat buildup occurs this could cause permanent motor damage. Avoid overloading, and resultant damage through the use of snatch blocks.

AUTOMATIC BRAKE

Anytime the Control Box is in the neutral or off position, the brake will automatically activate against a load. When powering “IN”, the brake will hold the load as soon as the switch is released. When powering “OUT”, the load will not stop as quickly, inertia in the gear train will cause several feet of wire rope to spool out after the switch is released. The heavier the load, the quicker the brake will lock.

NOTICE Maintenance

One of the unique features of this machine is its sealed construction. No internal lubrication by the owner is needed for the life of the winch. Check battery cables at 90-day intervals to be certain that they are clean and tight at all terminals and connections. Be sure the 8D battery is properly charged at all times. Following the specified precautions, rules, instructions and maintenance repair procedures, you may realize years of added service life with your Pipe Puller.

SAFETY INSTRUCTIONS

READ ALL INSTRUCTIONS BEFORE INSTALLATION AND UNDERSTAND ALL SAFETY RULES BEFORE USING THE PIPE PULLER.

Your Pipe Puller is a powerful and versatile tool, yet simple to operate. Because winching power can be dangerous, you should read the Owners Manual and practice operation of the unit BEFORE PUTTING IT TO USE.

THIS WINCHING TOOL IS NOT RATED FOR USE AS A HOIST, SHOULD NEVER BE USED FOR ANYTHING OTHER THAN WHICH IT IS DESIGNED.

⚠ CAUTION **Basic Safety Rules**

1. Never utilize the Pipe Puller in any operation where personal safety is endangered.
2. In every winching situation, make sure that the anchor is properly wedged. Always stand clear of the winch cable while pulling. **OPERATE PIPE PULLER FROM OUTSIDE OF PIPE, CLEAR FROM WIRE ROPE AND ATTACHMENTS.** Recoil from over tensioned loads on wire rope and assemblies will create hazardous conditions.
3. Never winch with less than eight (8) wraps of wire rope around the winch drum.
4. Your Pipe Puller is never to be used for lifting or pulling personnel.
5. The wire rope must always spool off the bottom of the drum as the puller faces the pipe being pulled. **The brake WILL NOT FUNCTION IF IT SPOOLS OFF THE TOP OF THE WINCH DRUM.**
6. Winching can be **DANGEROUS**. Avoid hasty operation. Always give proper attention to pipe being pulled, wire rope, rigging and anchor.
7. To ensure proper functioning of the Control Box before winching operation, inspect remote control lead for cracks, worn control cord, exposed electrical wires in control cord, loose connections, interference from wire rope of Puller frame.
8. Before winching operations, inspect wire rope on winch and pulling bridles to make certain they pass Federal OSHA standards (1926.251). Such problems as sever crushing, excess wire breakage, corrosion, reduction in diameter, worn elongated or bent fittings, etc., will be cause for replacement.
9. **KEEP HANDS AWAY** from drum, fairlead (rollers), wire rope and rigging while operating.
10. Always observe all **WIRE ROPE SAFETY RULES**. (See next page...)

⚠ CAUTION  **WIRE ROPE SAFETY RULES**

1. Never exceed the rated capacity for winching. A broken wire rope can recoil with considerable force. See winch manual and pages 8 & 9 of this booklet for winching capacities.
2. Use Control Box intermittently to take up wire rope slack. Shock loading of wire rope can momentarily far exceed the winch and wire rope pulling capacity. Ease system into pulling position.
3. When retrieving or spooling in wire rope, always release Control Box “IN” button when snatch block or end fitting of winch line is at least 6 feet from the fairlead rollers. Never “two-block” snatch blocks when multiple reeving. Activate the Control Box intermittently while holding wire rope by snatch block. Under light or no load situation, the winch will retrieve several feet of wire rope after “in” switch is released.
4. Always inspect and rewind the wire rope after use and keep it ready for the next job. Remember, wire rope assemblies that have been crushed, corroded, permanently elongated, or those that show excessive wire breakage, wear or defect, etc., shall be replaced. [See Federal OSHA standards (1926.251)].
5. Always pull as straight as possible. The fairlead (rollers) are designed to help with minor misalignment, but wire rope strength is severely reduced when forced to bend.
6. Before pulling with a new wire rope winch line, it should be straightened to its entire length, fastened to the winch drum and spooled onto drum under a load of at least 500 pounds. (The winch line **must** always spool off the bottom of the drum as the Puller faces the pipe being pulled). While spooling onto winch drum, make certain that each wrap is placed firmly near adjacent wraps, without any gaps.
7. For personal protection, wear leather work gloves when handling wire rope. Frayed wire rope can catch clothing or result in personal injury. Never allow wire rope to run through your hands without proper protection from gloves etc. Operator must stand clear of winch line and pulling bridle when winch is in under load.
8. Inspect Pulling Hooks daily. If a hook shows signs of damage from cracks, heat damage, weld spatter, or if they have more than 15% in excess of normal throat opening or more than 10 degree twist from the plane of the unbent hook, the hook shall be retired.

NOTICE OPERATING INSTRUCTIONS

SETTING UP THE PIPE PULLER:

Place unit in trench using LIFTING EYE on top of unit as a connection point. Extend WHEEL DOLLY with DOLLY EXTENDER and position unit in pipe with WINCH CABLE facing outward.

Step 1: Place Pipe Puller in front of ANCHOR, having front of machine facing pipe to be laid. Once placed into position, retract WHEEL DOLLY so that wheels are in folded position beneath FRAME ENCLOSURE.

Step 2: Setting ANCHOR: Place BOTTOM SHOE 8" from rear edge of pipe, [or last pipe installed], with TOP SHOE angled slightly forward towards front of pipe. Wedge ANCHOR into place by tapping TOP SHOE with a hammer. NOTE: Do NOT set up ANCHOR over seal of joint. Doing so may cause PIPE BREAKAGE.

Step 3: Fasten ANCHOR CONNECTOR from pipe puller onto BOTTOM SHOE of ANCHOR.

Step 4: Attach HOOKS or PULLING BEAM to PULLING BRIDLE by means of a 7/8" Screw Pin Anchor Shackle.

Step 5: Run WINCH CABLE through sheave on SNATCH BLOCK, attach thimble eye end of WINCH CABLE back to front of machine using SHACKLE PROVIDED. For a 4-part, multiple sheaved system, run WINCH CABLE through first sheave on double SNATCH BLOCK, back towards the single sheave SNATCH BLOCK on the machine attached to SHACKLE provided, then through the second sheave on the double SNATCH BLOCK and fasten thimble eye of WINCH CABLE to other SHACKLE provided on front of machine.

Step 6: Rotate CLUTCH LEVER clockwise to FREE SPOOL position. Pull on SNATCH BLOCK (which is attached to WINCH CABLE), while maintaining tension on WINCH CABLE back to the drum. NOTE: Maintaining tension on WINCH CABLE will prevent cable from developing too much slack on winch drum, causing crushing of wire rope.

Step 7: Attach PULLING BRIDLE to SNATCH BLOCK by means of the HOOK on the SNATCH BLOCK through the Master Link of PULLING BRIDLE. Then rotate CLUTCH LEVER counter clockwise to ENGAGED position.

Step 8: Release more WINCH CABLE by free spooling DRUM to attach HOOKS or PULLING BEAM to bell of pipe.

Step 9: Push "IN" button on Control BOX, pulling joint into place.

Note: DO NOT hold "IN" button continuously once pipe is in place. Pipe Puller has an AUTOMATIC BRAKE and will continue to hold a bind on joint until brake is released by pushing "IN" or "OUT" button on CONTROL BOX. There is no reason to keep winch running unnecessarily.

Operating Instructions - Continue on Page 6

Step 10: Press “OUT” button to release cable and disconnect HOOKS or PULLING BEAM from bell of pipe.

Step 11: After next joint is lowered into trench, pull HOOKS or PULLING BEAM (which are still attached to cable), through pipe being lowered and attach HOOKS or PULLING BEAM to bell of pipe. Repeat Steps 9 and 10 until WINCH CABLE becomes too short, (leaving no less than 8 wraps on WINCH DRUM), to set another pipe section.

NOTE: Depending on length of pipe, 3-4 joint may be laid in 4-part multiple sheave system before machine need be moved forward. Approximately 8 joints of smaller pipe may be laid in 2-part sheaving systems before machine need be moved forward.

MOVING PIPE PULLER THROUGH PIPE AND RESETTING:

Step 1: Release tension on WINCH CABLE by pressing “OUT” button on CONTROL BOX, yet leaving HOOKS or PULLING BEAM attached to bell of last pipe placed.

Step 2: Stand behind ANCHOR and, while holding TOP LEG of ANCHOR with one hand, tap back side of TOP SHOE with hammer. This will release ANCHOR.

Step 3: Leaving Pipe Puller attached to ANCHOR assembly, lay upper leg of ANCHOR onto ANCHOR GUARD.

Step 4: Wrap CONTROL CABLE on front of machine, leaving enough loose to reach a safe walking distance at rear of machine, without leaving slack in front of machine.

Step 5: While behind machine with CONTROL BOX in hand, press “IN” button. This pulls machine and ANCHOR forward. Stop when you approach the second to last pipe laid.

Step 6: Set up ANCHOR as explained in Step #1 or OPERATING INSTRUCTIONS, SETTING UP PIPE PULLER procedure, then repeat steps 8-11 under same instructions.

S CHARGER OPERATION:

Before using battery charger read and understand the operating and instruction manual for model# 1JYU5 charger supplied by Dayton Mfg. Co. and follow all safety precautions prior to connecting charger to a 120vac power source.

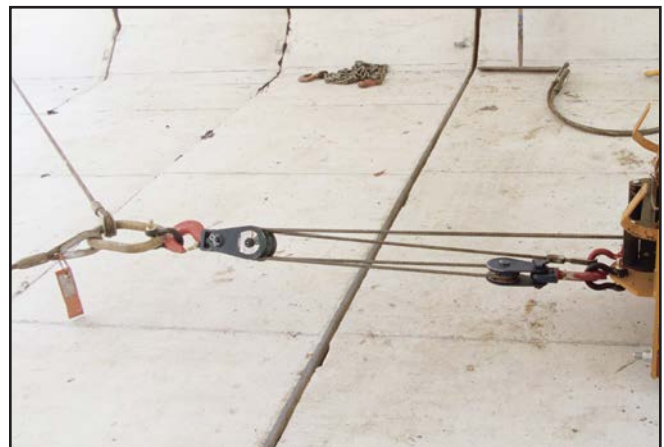
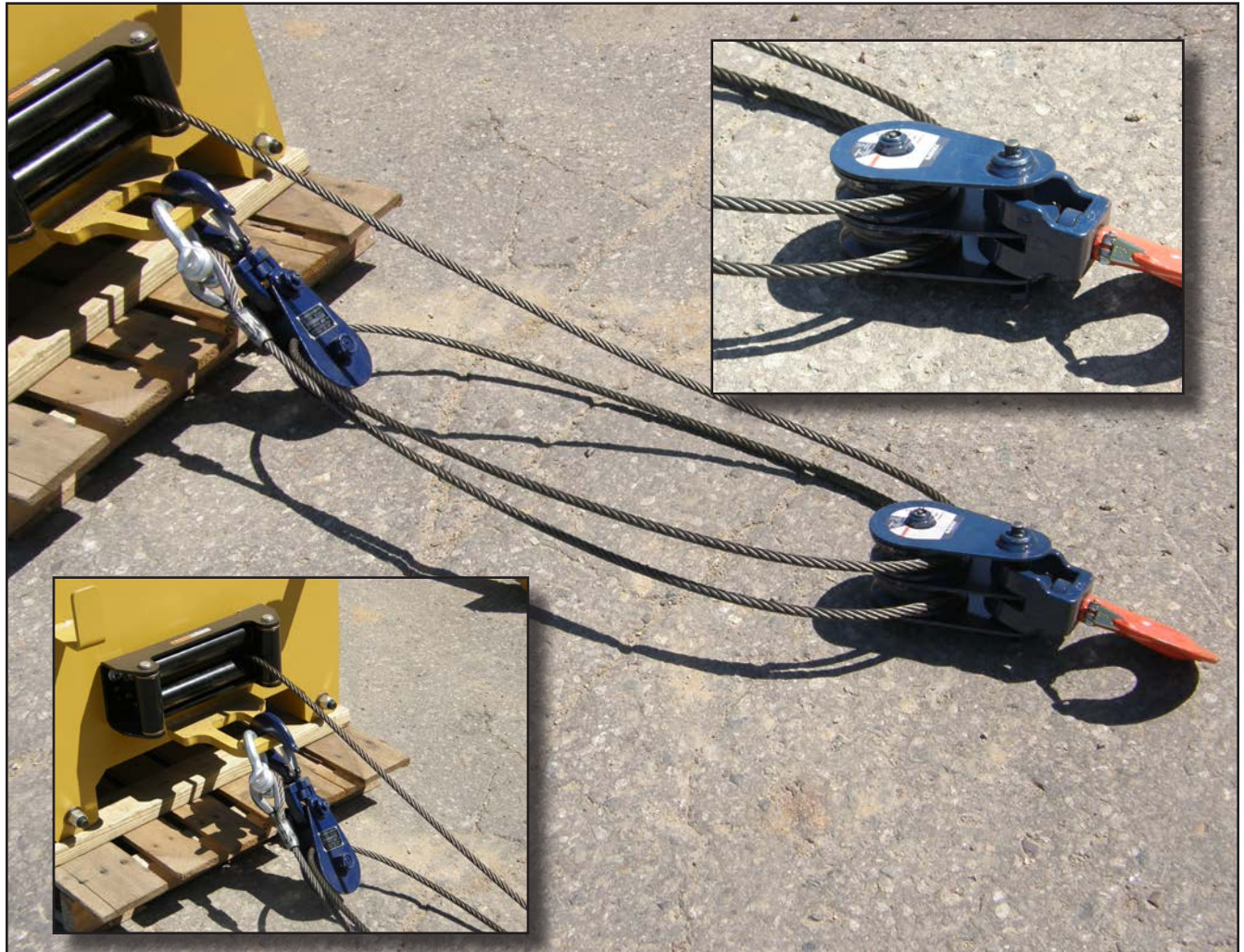
The battery charger is located under the battery compartment cover and output leads are attached directly to the battery cables.

Make sure that the charger is set for the correct battery voltage prior to connecting charger to an appropriate 110 volt source.

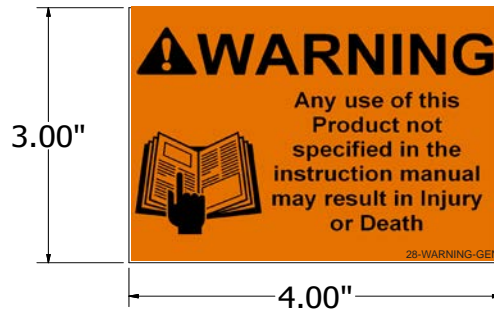
Unplug charger when not in use.

SNATCH BLOCK SPECIFICATIONS

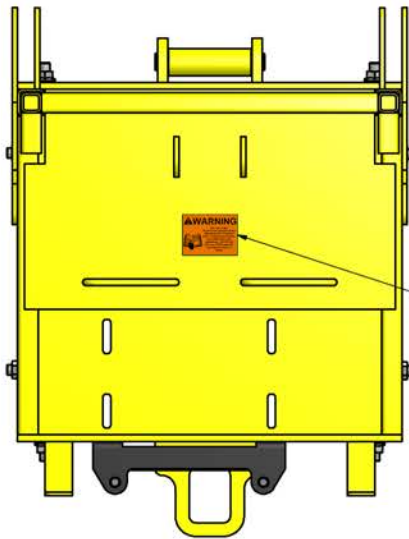
	Sheave Size	Center Pin	Weight	Working Load Limit
Single	4 1/2"	1"	11 lbs	4 Tons
Double	4 1/2"	1"	16 lbs.	4 Tons



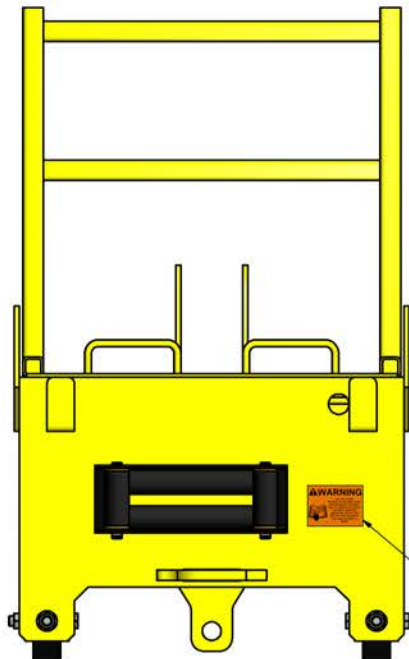
WARNING LABELS



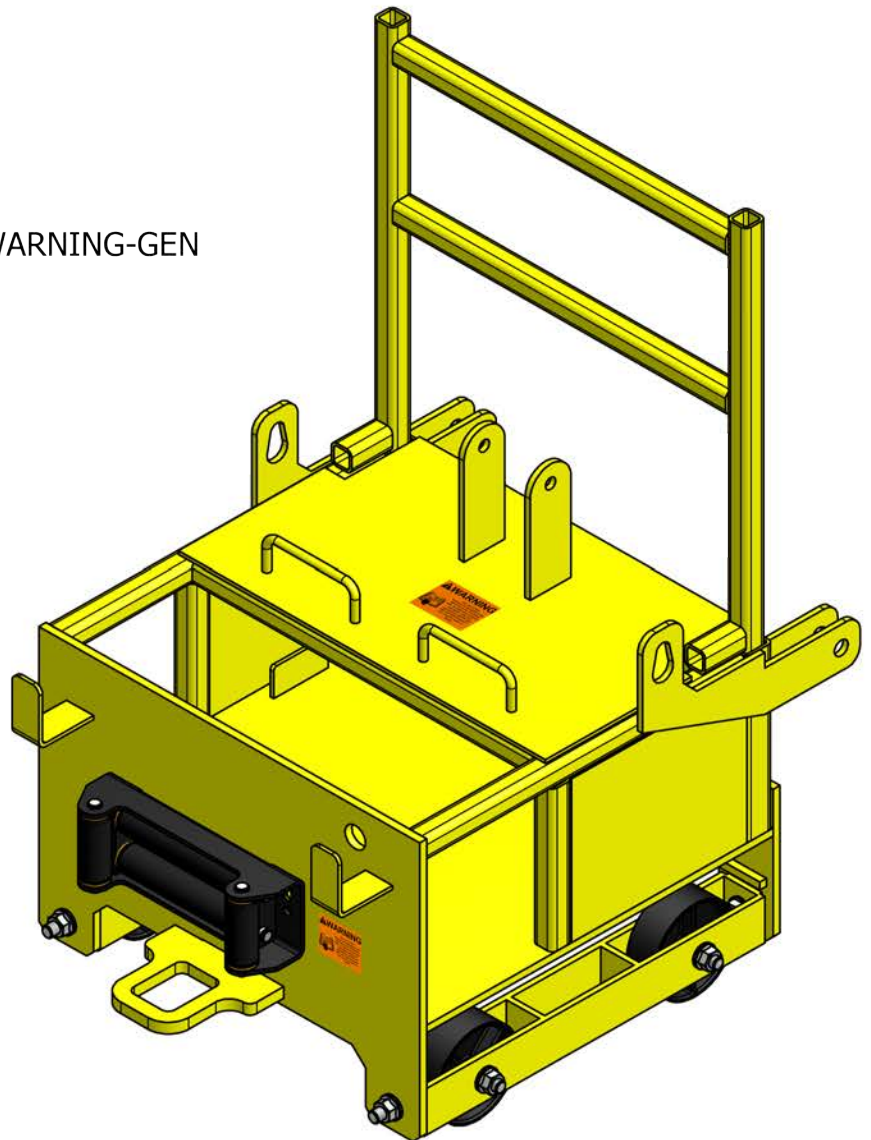
PART # 28-WARNING-GEN



28-WARNING-GEN



28-WARNING-GEN



PIPEPULLER-V2

Quick-Joint™ Pipe Puller - Operator Manual

EACH PIPE PULLER TO INCLUDE:

SERIAL# _____

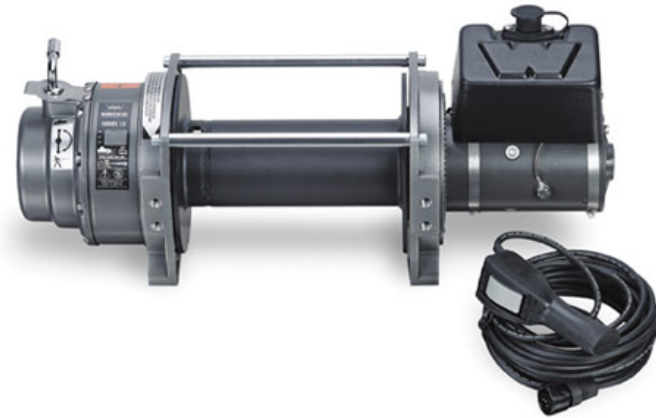
- 1 FRAME & ANCHOR BAR
- 1 WINCH
- 1 CONTROL UNIT w/32' CABLE
- 1 BATTERY CHARGER
- 1 100' WIRE ROPE
- 2 7/8" SHACKLE
- 2 3/4" SHACKLE
- 1 SINGLE SHEEVE SNATCH BLOCK
- 1 DOUBLE SHEEVE SNATCH BLOCK
- 1 BRIDLE ASSEMBLY 3/4" x 7"
- 1 SET OF STEEL HOOKS
- 2 3/4" x 5 1/4" (WL) HITCH PIN
- 2 5/8" x 5 3/4" (WL) HITCH PIN

ANCHOR STANDARD SET-UP

- 1 TOP SHOE
- 1 BOTTOM SHOE
- 1 LOWER LEG 20"
- 1 UPPER LEG 20"
- 1 LOWER LEG 40"
- 1 UPPER LEG 40"
- 1 UPPER LEG 68"
- 1 1 1/4" x 4" ANCHOR PIN WITH 5/16" LYNCH PIN
- 2 1 1/4" x 6 1/4" (WL) HITCH PIN



Tow Truck & Industrial DC Electric Winches: Series 15



Series 15 DC

12 or 24V Electric Winch Pulls up to 15,000 lbf.

15 DC SPECS/PART NUMBERS

Part Number: 66032 12V

Part Number: 65932 24V

Rated Pulling Force: 15000 lbf (6804 kg)

Drum Barrel Diameter: 4.0 in (102mm)

Drum Flange Diameter: 8.24 in (209mm)

Distance Between Flanges: 9.95 in (253mm)

Recommended Maximum Wire Rope Diameter: 1/2 in (12.7 mm)

Recommended Minimum Wire Rope Breaking Strength: 26600 lbf (12066 kgf)

Approximate Shipping Weight - 66032: 106.0 lb (48.1 kg)

Approximate Shipping Weight - 65932: 104.0 lb (47.2 kg)

Duty Cycle (intermittent per SAE J706 section 6.2): 55 ft (16.8 m)

Mounting Bolt Torque: 35 - 40 ft*lbf (47 - 54 N*m)

Maximum Layers of Wire Rope: 3 (with 1/2" dia. rope)

Gear Reduction: 315:1

Brake Type: Disk

Contactor / Remote Type: Industrial contactor with 33' (10m) heavy duty remote

Standards Compliance - 66032: SAE J706

Standards Compliance - 65932:

SAE J706

CE Machinery Directive 98/37/EC and 2006/42/EC

CE Electromagnetic Compatibility 2004/108/EC

ACCESSORIES

Wire Rope Tension Plate 10'': PN 31149

Fairlead Black 10'': PN 24336

Fairlead Chrome 10'': PN 30859

Remote Clutch Mechanical: PN 38316

Remote Clutch Air: PN 71370

Wire Rope Assembly 1/2''x75': PN 77534

12V PERFORMANCE DATA BY LAYER - 1/2" (12.7 mm) dia. rope

Drum Layer	Line Load *			No Load Line Speed		Drum Capacity	
	lbf	kgf	kN	ft/min	m/min	ft	m
1	15000	6804	66.7	16.1	4.9	20	6.1
2	12272	5566	54.6	19.6	6.0	45	13.7
3	10384	4710	46.2	23.2	7.1	75	22.9

* Never exceed the Rated Pulling Force. Installation of a Rated Capacity Limiter is recommended.

12V FIRST LAYER PERFORMANCE

Line Load		Current Draw	Line Speed		Duty Cycle
lbf	kgf	Amps	ft/min	m/min	min/10min
0	0	111.0	16.1	4.9	6.2
3000	1361	216.0	13.0	4.0	2.3
6000	2722	302.0	9.6	2.9	1.4
9000	4082	390.0	8.0	2.4	1.1
12000	5443	477.0	6.0	1.8	1.0
15000	6804	561.0	5.2	1.6	0.8



WARN Industrial Winch

Model

Part Number

Motor Type

**Series 15-A-1D
Electric Winch
Manual Clutch**

66032

DC Electric
12 Volt
Series Wound

The Series 15 DC features an extended run time high powered DC motor with a weatherproof industrial contactor and heavy duty remote control. The disc brake is designed for extended power-out use. Designed to meet SAE J706 standards. The motor is protected by a thermal over load switch.

*Remote Control Assembly, 10m included



Accessories

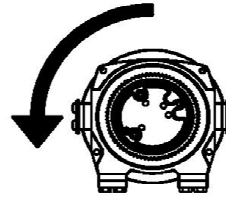
Description:	Part Number
Wire Rope Tension Plate 10"	31149
Fairlead Black 10"	24336
Fairlead Chrome 10"	30859
Remote Clutch Mechanical	38316
Remote Clutch Air	71370
Wire Rope Assembly 1/2"x75'	77534

Engineering Data

Rated Pulling Force:	15000 lbf	6804 kgf
Drum Barrel Diameter:	4.0 in	102 mm
Drum Flange Diameter:	8.24 in	209 mm
Distance Between Flanges:	9.95 in	253 mm
Recommended Maximum Wire Rope Diameter:	1/2 in	12.7 mm
Recommended Minimum Wire Rope Breaking Strength:	26600 lbf	12066 kgf
Approximate Shipping Weight:	106.0 lb	48.1 kg
Duty Cycle (intermittent per SAE J706 section 6.2):	55 ft	16.8 m
Mounting Bolt Torque:	35 - 40 ft*lbf	47 - 54 N*m
Maximum Layers of Wire Rope:	3 (with 1/2" dia. rope)	
Gear Reduction:	315:1	
Brake Type:	Disk	

Contact / Remote Type: Industrial contactor with 33' (10m) heavy duty remote

Drum Rotation



Viewed from Motor End

Standards Compliance

1. -SAE J706

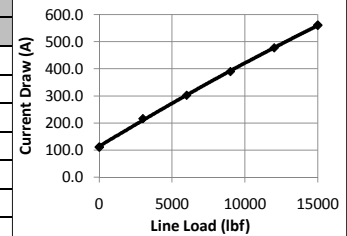
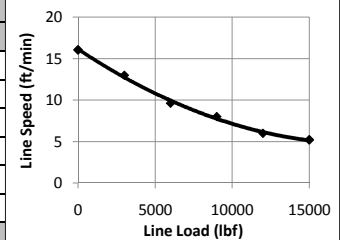
Performance By Layer- 1/2" (12.7 mm) dia. rope

Drum Layer	Line Load *			No Load Line Speed		Drum Capacity	
	lbf	kgf	kN	ft/min	m/min	ft	m
1	15000	6804	66.7	16.1	4.9	20	6.1
2	12272	5566	54.6	19.6	6.0	45	13.7
3	10384	4710	46.2	23.2	7.1	75	22.9

* Never exceed the Rated Pulling Force. Installation of a Rated Capacity Limiter is recommended.

First Layer Performance

Line Load		Current Draw	Line Speed		Duty Cycle
lbf	kgf	Amps	ft/min	m/min	min/10min
0	0	111.0	16.1	4.9	6.2
3000	1361	216.0	13.0	4.0	2.3
6000	2722	302.0	9.6	2.9	1.4
9000	4082	390.0	8.0	2.4	1.1
12000	5443	477.0	6.0	1.8	1.0
15000	6804	561.0	5.2	1.6	0.8



WARN INDUSTRIES, INC
Industrial Products

Customer Service (North America): 1.800.543.9276
Customer Service (International): 1.503.722.3008
FAX: 1.503.722.3000 www.warn.com

12900 S.E. Capps Road,
Clackamas, OR USA 97015

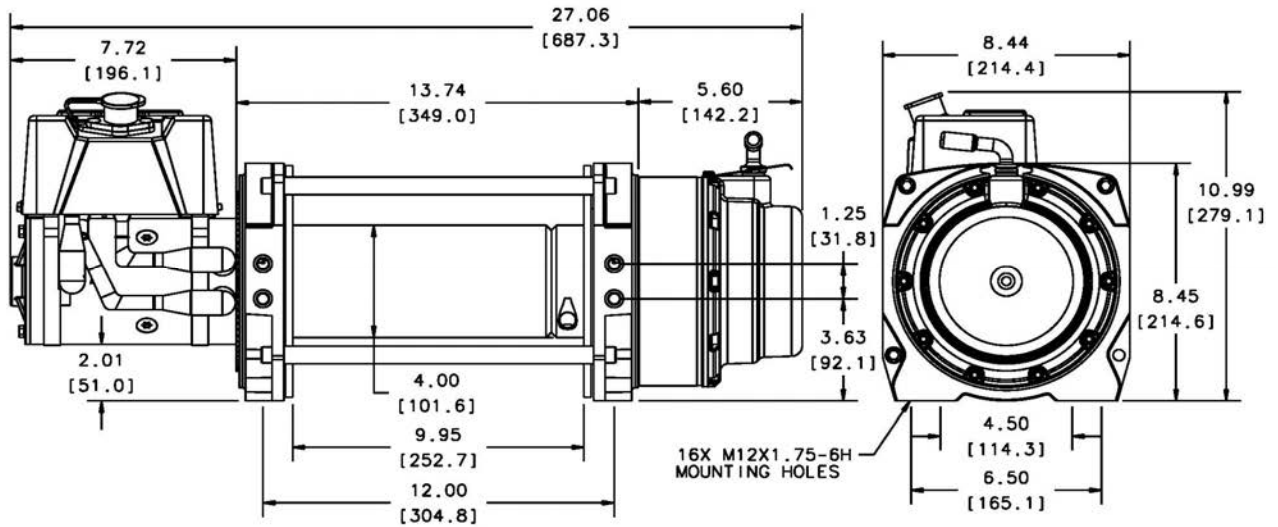
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Quick-Joint™ Pipe Puller - Operator Manual



WARN Industrial Winch

Model	Part Number	Motor Type
Series 15-A-1D Electric Winch Manual Clutch	66032	DC Electric 12 Volt Series Wound



Motor / Contactor may be rotated in 90 degree increments. Clutch housing may be rotated in 72 degree increments.

Units are given in inches [millimeters], unless otherwise specified

Recommended Mounting- Always Observe Correct Drum Rotation			Electrical System Specifications	
Pull from bottom of winch	Pull from bottom of winch	Pull from top of winch	650 CCA 8D Battery Minimum	
			See Electrical Cable Gauge Size Chart for cable sizing	
Feet down	Feet forward	Feet forward	All electrical connections must be clean and tight	
Pull from top of winch	Pull from top of winch	Pull from top of winch	Electrical System Wiring Schematic	
Feet down without angle brace	Feet down with angle brace	Angle Braces Only	Notes:	

WARN INDUSTRIES, INC
Industrial Products

Customer Service (North America): 1.800.543.9276
Customer Service (International): 1.503.722.3008
FAX: 1.503.722.3000 www.warn.com

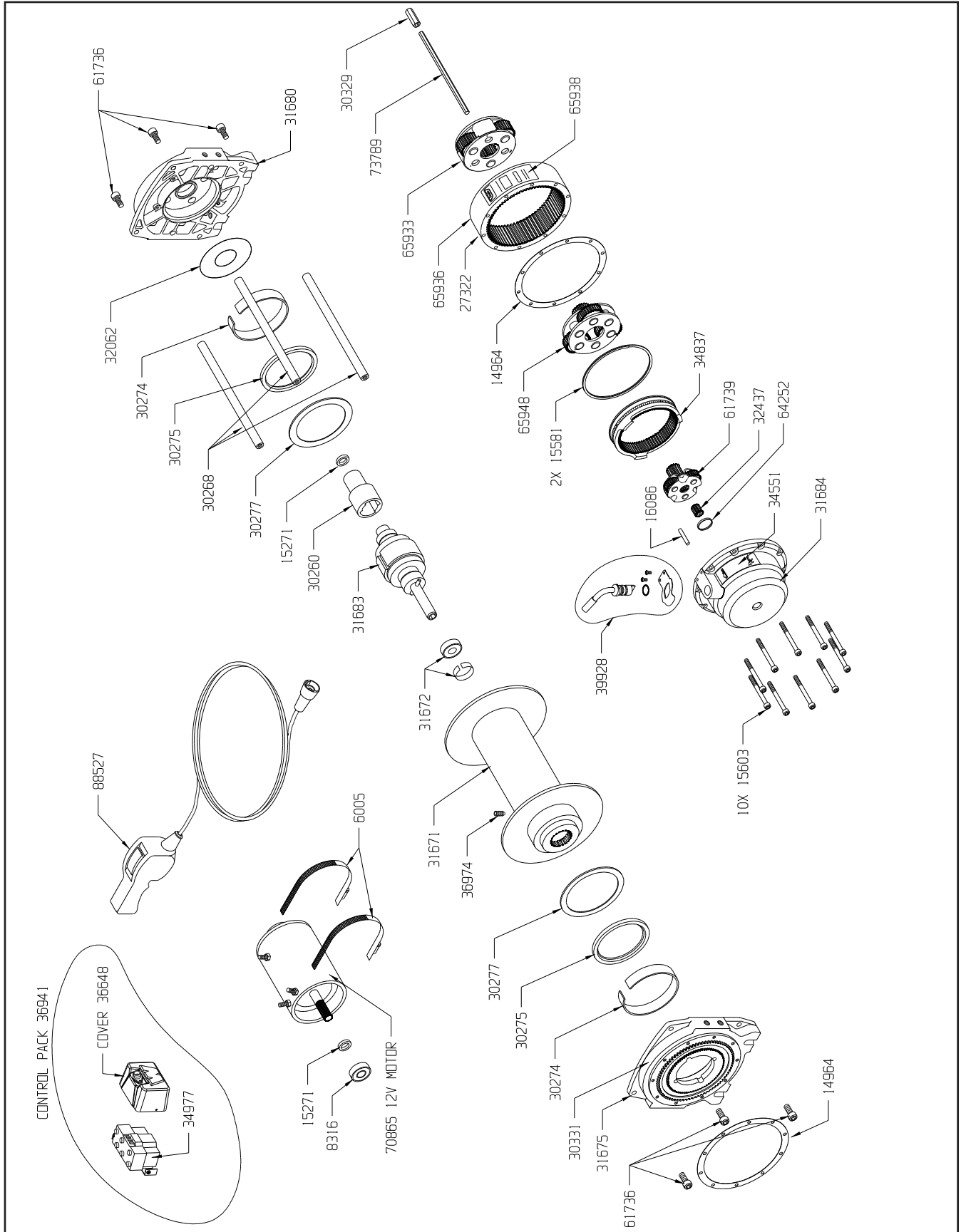
12900 S.E. Capps Road,
Clackamas, OR USA 97015

Quick-Joint™ Pipe Puller - Operator Manual



Service Part Kit List: SERIES 15 12v (66032)

Part Number	Description
36941	S/P CONTROL PACK, 12V, TRIPLE
36648	S/P,COVER,C/P,CIM REMOTE PLUG/
34977	S/P CONTCTR, 12V SW,
88527	SVC KIT_REMOTE CONTROL-10M
15271	SPACER,MOTOR
8316	BEARING,BALL,17X40MM
70865	S/P MOTOR KIT
6005	CLAMP,HOSE,IDEAL 5072
61736	CAPSCREW,SELF TAP,SOC HD,3/8-1
31680	S/P DRUM SUPPORT ASSY,
32062	MASK,DRUM,LG FRAME
30274	BUSHING, DRUM, NYLATRON, CIM L
30275	SEAL, RADIAL OIL, 4.0 I
30268	TIE ROD, .625 X 10.58
30277	WASHER, THRUST, NYLATRON, CIM
30260	DRIVER BRAKE,ELEC,DISK BRAKE
31683	S/P DSK BRK ASSY,CCW ELEC.
31672	(MTO) S/P BEARING & TOL. RING
31671	S/P DRUM ASSY, STD.
36974	(KB) SET SCREW, DOG POINT, M10
30331	LABEL, DRUM ROTATION
31675	S/P DRUM SUPPORT ASSY,
14964	GASKET, RING GEAR
30329	ADAPTER, DRIVE SHAFT, DISK BRA
73789	SHAFT, DRIVE, HEX 5/16 X 7.080
65933	CARRIER(PH)ASSEMBLY, 3RD STAGE
65938	LABEL, NAME PLATE, SERIES 15
65936	RING GEAR, ARGENT, SER 15
27322	DECAL,WARNING,WINCH
65948	CARRIER ASSY, STAGE 2
15581	RING, RETAINING, FS WN
34837	RING GEAR,L.F. FOR DBL RET RIN
61739	CARRIER (PH) ASSEMBLY,STAGE 1
32437	GEAR,SUN,12 TOOTH,16P,5/16 HEX
64252	THRUST PLUG
16086	(KB) DOWEL PIN, 1/4 X 1-1/2
39928	S/P CLUTCH LEVER ASSY CCW
34551	LABEL, CLUTCH ENGAGEMENT
31684	GEAR HSG ASSY, SERIES 12
15603	CPSCR SOC HD 1/4-20X3 GR8 PL,




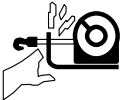

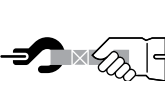

Quick-Joint™ Pipe Puller - Operator Manual




General Safety Precautions


Warnings and Cautions



As you read these instructions, you will see WARNINGS, CAUTIONS, NOTICES and NOTES. Each message has a specific purpose. WARNINGS are safety messages that indicate a potentially hazardous situation, which, if not avoided could result in serious injury. CAUTIONS are safety messages that indicate a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. A CAUTION may also be used to alert against unsafe practice. CAUTIONS and WARNINGS identify the hazard, indicate how to avoid the hazard, and advise of the probable consequence of not avoiding the hazard. NOTICES are messages to avoid property damage. NOTES are additional information to help you complete a procedure. **PLEASE WORK SAFELY!**

 WARNING		
		
 $\geq 1/2"$ (13mm)		
<p>MOVING PARTS ENTANGLEMENT HAZARD</p> <p>Failure to observe these instructions could lead to severe injury or death.</p> <p>To avoid injury to hands or fingers:</p> <ul style="list-style-type: none"> • Always keep hands clear of rope, hook loop, hook and fairlead opening during installation, operation and when spooling in or out. • Always use extreme caution when handling hook and rope during spooling operations. • Always use supplied hook strap whenever spooling rope in or out, during installation, and during operation. • Always use a hook marked 1/2" (13 mm) or larger with Series 15 or 18 fairlead. 		

 WARNING	
	
<p>CHEMICAL AND FIRE HAZARD</p> <p>Failure to observe these instructions could lead to severe injury or death.</p> <ul style="list-style-type: none"> • Always remove jewelry and wear eye protection. • Never lean over battery while making connections. • Always verify area is clear of fuel lines, fuel tank, brake lines, electrical wires, etc. when drilling. • Never route electrical cables: <ul style="list-style-type: none"> - Across any sharp edges. - Through or near moving parts. - Near parts that become hot. • Always insulate and protect all exposed wiring and electrical terminals. • Always install terminal boots as directed in installation instructions. 	

 WARNING	
<p>Failure to observe these instructions could lead to property damage, severe injury, or death.</p> <ul style="list-style-type: none"> • Never exceed the maximum recommended hydraulic pressure or flow for any of the components used. • Always connect the winch to the hydraulic system as shown in the hydraulic schematic. • Always use the correct type of control valve as shown in the hydraulic schematic. • Always Stand clear of hydraulic lines during operation. • Always install hydraulic components in accordance with manufacturer's recommendations. 	

General Safety Precautions



CAUTION

MOVING PARTS ENTANGLEMENT HAZARD

Failure to observe these instructions could lead to minor or moderate injury.

General Safety:

- **Always** know your winch. Take time to fully read the Installation and Operations Guide in order to understand your winch and its operation.
- **Never** operate this winch if you are under 16 years of age.
- **Never** operate this winch when under the influence of drugs, alcohol or medication.
- **Never** exceed winch or rope capacity listed on product data sheet. Double line using a snatch block to reduce winch load.

Installation Safety:

- **Always** choose a mounting location that is sufficiently strong to withstand the maximum pulling capacity of your winch.
- **Always** use factory approved mounting hardware, components, and accessories.
- **Always** use grade 5 or better mounting hardware.
- **Never** weld mounting bolts.
- **Always** use care when using longer bolts than those supplied from factory. Bolts that are too long can damage the base and/or prevent the winch from being mounted securely.
- **Always** mount the winch and attach the hook to the rope's end loop before connecting the electrical wiring.
- **Always** position fairlead with WARNING label on top.
- **Always** spool the rope onto the drum in the direction specified by the drum rotation label on the winch and/or documentation. This is required for the automatic brake to function properly.
- **Always** prestretch wire rope and respool under load before use. Tightly wound wire rope reduces chances of "binding", which can damage the rope.



CAUTION



MOVING PARTS ENTANGLEMENT HAZARD

Failure to observe these instructions could lead to minor or moderate injury.

- **Always** inspect, rope, hook, and slings before operating winch. Damaged components must be replaced before operation. Protect parts from damage.
- **Never** leave remote control plugged into winch when free spooling, rigging, or when the winch is not being used.
- **Never** hook rope back onto itself. This damages the rope.
- **Always** use a choker chain, choker rope, or tree trunk protector on the anchor.
- **Always** remove any element or obstacle that may interfere with safe operation of the winch.
- **Always** take time to use appropriate rigging techniques for a winch pull.
- **Always** be certain the anchor you select will withstand the load and the strap or chain will not slip.
- **Never** engage or disengage clutch if winch is under load, rope is in tension or drum is moving.
- **Always** double line or pick distant anchor point when rigging. This maximizes pulling power and avoids overloading the winch.
- **Never** winch with less than 5 wraps of rope around the drum. The rope could come loose from the drum.
- **Never** touch rope or hook while in tension or under load.
- **Never** touch rope or hook while someone else is at the control switch or during winching operation.
- **Never** touch rope or hook while remote control is plugged into winch.
- **Always** stand clear of rope and load and keep others away while winching.
- **Always** be aware of stability of vehicle and load during winching. Alert all bystanders of any unstable condition.

General Safety Precautions


 **CAUTION**

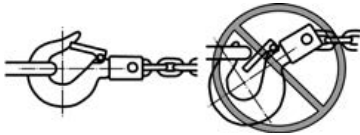
 

CUT AND BURN HAZARD
Failure to observe these instructions could lead to minor or moderate injury.

To avoid injury to hands and fingers:

- Always wear heavy leather gloves when handling a wire rope.
- Never let rope slip through your hands.
- Always be aware of possible hot surface at winch motor, drum or rope during or after winch use.

 **CAUTION**



MOVING PARTS ENTANGLEMENT HAZARD
Failure to observe these instructions could lead to minor to moderate injury.

- Always use a hook with a latch.
- Always insure hook latch is closed and not supporting load.
- Never apply load to hook tip or latch. Apply load only to the center of hook.
- Never use a hook whose throat opening has increased, or whose tip is bent or twisted.

 **CAUTION**

MOVING PARTS ENTANGLEMENT HAZARD
Failure to observe these instructions could lead to minor or moderate injury.

- Always keep remote control lead clear of the drum, rope and rigging. Inspect for cracks, pinches, frayed wires or loose connections. Replace remote control if damaged.
- Always pass remote control through a window to avoid pinching lead in door, when using remote inside a vehicle.

NOTICE

AVOID WINCH AND EQUIPMENT DAMAGE

- Always avoid side pulls which can pile up rope at one end of the drum. This can damage rope or winch.
- Always ensure the clutch is fully engaged or disengaged.
- Never use winch to tow other vehicles. Shock loads can momentarily exceed capacity of rope and winch.
- Always use care to not damage the vehicle frame when anchoring to a vehicle during a winching operation.
- Never "jog" rope under load. Shock loads can momentarily exceed capacity of rope and winch.
- Never use winch to secure a load during transport.
- Never submerge winch in water.
- Always store the remote control in a protected, clean, dry area.

 **WARNING**

FALLING OR CRUSHING HAZARD
Failure to observe these instructions could lead to severe injury or death.

- Never use winch to lift or move persons.
- Never use winch as a hoist or to suspend a load.

WARN Industrial Winches

What is a Winch?

WARN Industries produces a large family of winches and hoists. But what makes a winch different than a hoist?

Winches and hoists look alike. Both consist of a motor, a rotating drum with rope, reduction gears, a base, and usually an electrical control system. However, winches and hoists are used for different purposes.

Winches are used to pull a load horizontally across the ground, while hoists are used to lift a load into the air. Unlike hoists, the operator of a winch may unwind cable by “free spooling” or disengaging the motor from the gear train using the built-in clutch. Then the operator reverses the position of the clutch to connect the motor to the gears and pull the load.

Mechanical Brake

The mechanical brake generates heat when loads are lowered and the wire rope is powered out. Care must be taken to avoid overheating the mechanical brake.

When using a winch to lower a heavy load, allow more time for the brake to cool between uses.

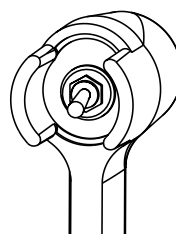
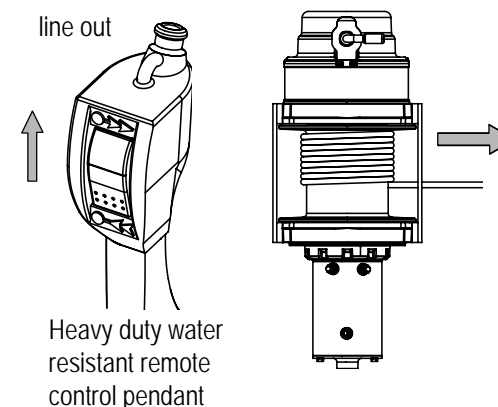
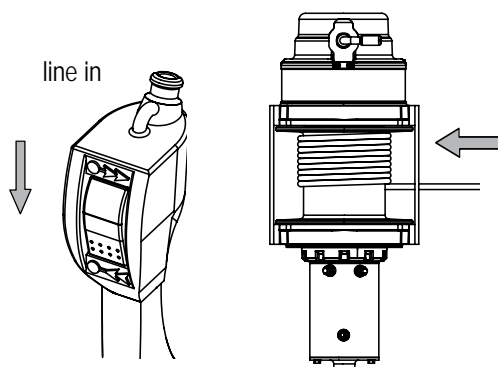
Whine or chatter associated with a new mechanical brake is normal and typically disappears with use.

OVERHEATING THE MECHANICAL BRAKE MAY RESULT IN PERMANENT DAMAGE TO, OR FAILURE OF, THE BRAKE. REPLACE ANY DAMAGED BRAKE COMPONENTS BEFORE RESUMING USE OF THE WINCH.

Remote Control

Switch operation

Do not leave the remote plugged into the winch when not in use. Leaving the remote plugged in may result in unexpected winch activation and/or battery drain.



Standard remote control pendant

Pre-Install Checklist

- 1 Check to see that you have received the following:
 - The winch
 - The controller
 - The remote control pendant
 - The winch mounting hardware
- 2 Upon removing winch from packaging, check for damage including bent or cracked tie rods, tie bars, or housings. Correct any damage before installing winch.
- 3 Make sure the environment surrounding winch and controller is free of :
 - Combustible vapors
 - Chemical fumes
 - Oil vapors
 - Corrosive material
- 4 Make sure that the air temperature surrounding the winch and controller stays within 120° F (49° C) and -20° F (-29° C).
- 5 Make sure that the mounting structure can withstand the full rated pull of the winch.

Mounting the Winch

Use the supplied fasteners whenever possible or SAE Grade 5 (8.8 metric) bolts of the same thread size. Both tie rods or tie bars must be in place. Flat washers and lock washers should be used between the bolt heads and mounting surface.

For thru bolt drum supports:

There should be 1 to 4 threads protruding above the square nut. Bolts that are too long may damage drum supports while bolts that are too short will not provide adequate strength. Flat washers and lock washers should be used between bolt heads and mounting surface.

For threaded drum supports:

Bolts that are too long may damage the drum supports and/or fail to anchor the winch tightly. Bolts that are too short will not provide adequate strength. The length of the bolt must allow it to extend between 15/16 inch (24 mm) and 1-3/8 inch (35 mm) into the base of the winch.

- 1 Make sure that the mounting surface is flat within +/-0.020 in. (0.50 mm). If the surface is not flat, use shim stock as needed to avoid straining the winch.
- 2 Torque all mounting bolts to the recommended values on the product data sheet.
- 3 Use the mounting hole locations provided on the product data sheet.

WARN Industrial Winches

Mounting the Controller (Electric Winches)

- 1 Remove the screws holding cover to controller bracket.
- 2 Mount the controller in an upright or vertical orientation so that water will not collect in the cover.
- 3 Mount controller in a location free of excessive vibration. Use lock washers to prevent mounting nuts from loosening.
- 4 Mount controller so it is protected from damage by tools or heavy objects.
- 5 The controller can be mounted in a location exposed to the weather; but it should be protected from the possibility of damage from tools or heavy objects.
- 6 Use the mounting dimensions shown.

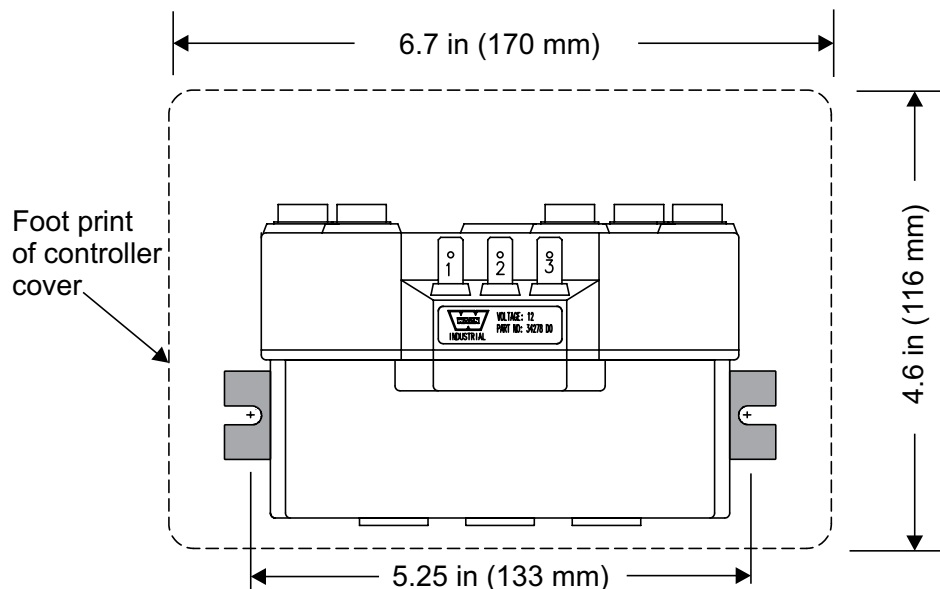


WARNING

FIRE HAZARD

Failure to observe these instructions could lead to severe injury or death.

- Never mount controller in an area where it may be used as a step or where tools will be hung or placed on it.
- Always avoid damage to terminals located on top surface of the enclosure.
- Always keep tools and other electrically conductive equipment away from terminals at all times.




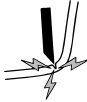

Mounting Dimensions for Typical Controller

Electric Cable Connections

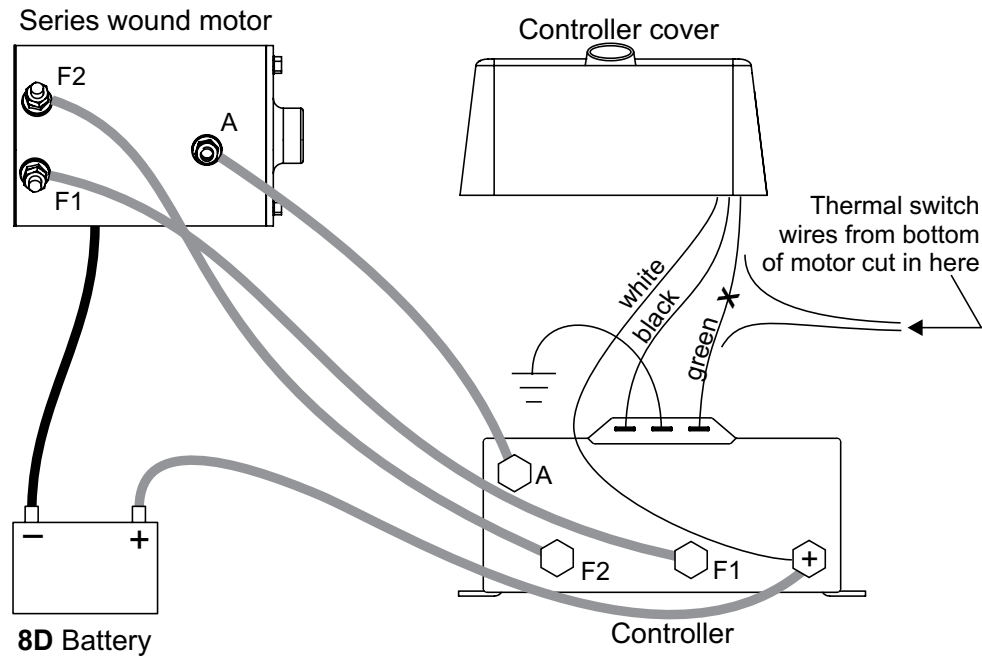
See illustrations on following page.

Connection guidelines:

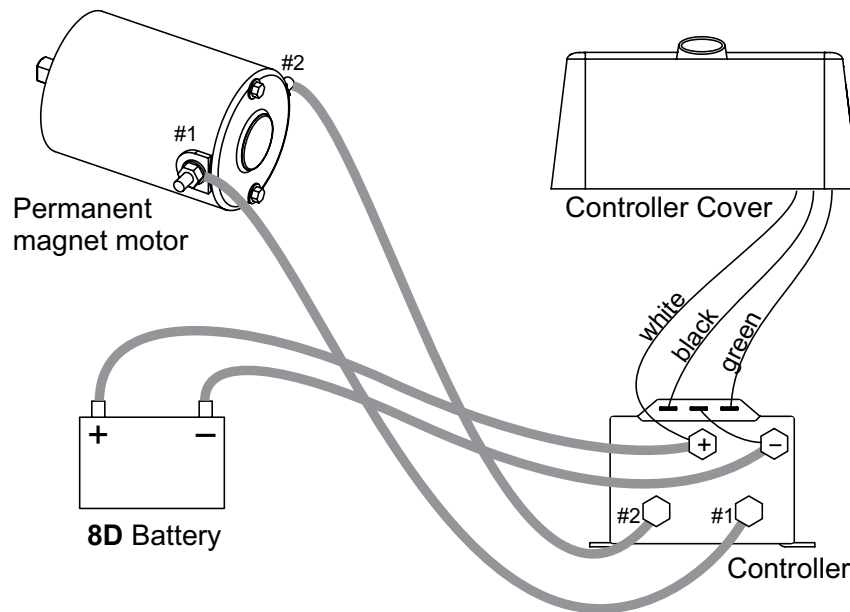
- Use #2 gauge battery cable for all power connections. Excess cable length can result in a voltage drop causing poor winch operation.
- Minimize cable length where possible. When cables longer than 10 feet (3m) are needed, use size #0 cable.
- Route cables along protected areas to avoid wear and damage.
- Use insulating boots on all exposed terminal connections to prevent electrical shorting. Slide terminal boots onto cables before connecting cables to terminals.
- Use splice connectors to attach the motor thermal-switch wires.
- Connect the F1, F2, A and ground cables as shown for clockwise models. For counterclockwise models, the F1 controller terminal must be connected to the F2 motor terminal, and the F2 controller terminal must be connected to the F1 motor terminal.
- Make sure all electrical connections are clean and tight.
- It is recommended that a power-cut off switch be installed in an easily accessible location. This will provide power shut-off during servicing and act as an added safety feature. Use a 300 amp switch.
- It is recommended that a 300 amp circuit breaker be installed in the positive (+) cable near the battery to protect against short circuits.

 WARNING	
	
CHEMICAL AND FIRE HAZARD Failure to observe these instructions could lead to severe injury or death. <ul style="list-style-type: none">• Never route electrical cables:<ul style="list-style-type: none">- Across any sharp edges.- Through or near moving parts.- Near parts that become hot.	

WARN Industrial Winches



Connections for series wound DC motors (3 terminals)



Connections for permanent-magnet DC motors (2 terminals)

Hydraulic Winches: General Information

NOTE: The hydraulic system diagram and component descriptions are provided for general reference. Consult a knowledgeable hydraulics representative for specific recommendations on component selection, interconnection, layout, and best practice.

The pressure rating of the winch motor is determined by a) the maximum allowable pressure at the motor inlet port and b) the maximum allowable pressure drop across the motor. Pressure drop is defined as the difference between the inlet port pressure and the outlet port pressure at the winch motor. Exceeding the maximum inlet pressure may damage the winch motor. Exceeding the maximum pressure drop may cause failure of winch components.

The recommended operating temperature range of the hydraulic motor is 100°F to 150°F (38°C to 66°C). The maximum operating temperature range is -6°F to 180°F (-21°C to 82°C). **Do NOT exceed the flow rating of the hydraulic motor.** See the product data sheet for specific hydraulic specifications.

Installation Final Check:

- Recheck mounting hardware for loose bolts, etc...
- Be sure all hydraulic system components and connections are correct.
- Be sure all hydraulic connections are secure.
- Check motor rotation: The drum should rotate in the direction indicated by the drum rotation label on top of the drum support. If drum rotates in opposite direction, recheck hydraulic and electrical connections.



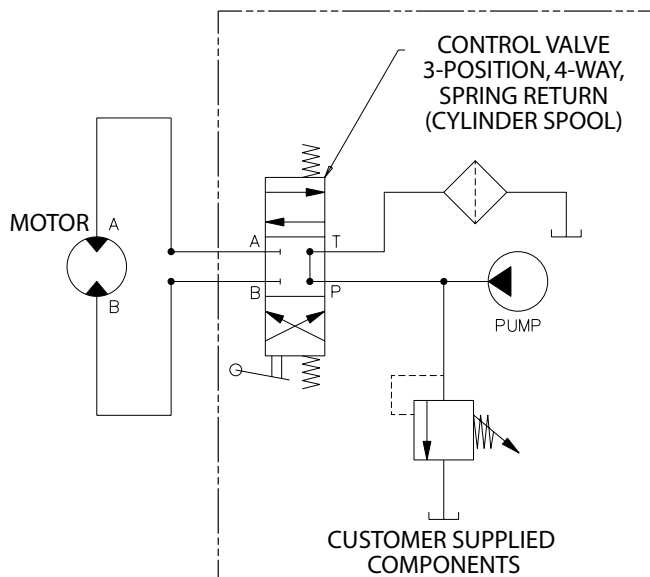
WARNING

Failure to observe these instructions could lead to property damage, severe injury, or death.

- **Never** exceed the maximum recommended hydraulic pressure or flow for any of the components used.
- **Always** connect the winch to the hydraulic system as shown in the hydraulic schematic.
- **Always** use the correct type of control valve as shown in the hydraulic schematic.
- **Always** Stand clear of hydraulic lines during operation.
- **Always** install hydraulic components in accordance with manufacturer's recommendations.

HYDRAULIC FLUID: The hydraulic fluid used with the winch must be an extreme pressure, anti-wear hydraulic oil with oxidation and corrosion inhibitors. It must contain a foam suppressant, and have a viscosity rating of 100-300 SUS at 60°F to 115°F (15°C to 46°C). The recommended nominal filtration level is 10 microns or finer.

Hydraulic Schematic



WARN Industrial Winches

Installing the Wire Rope

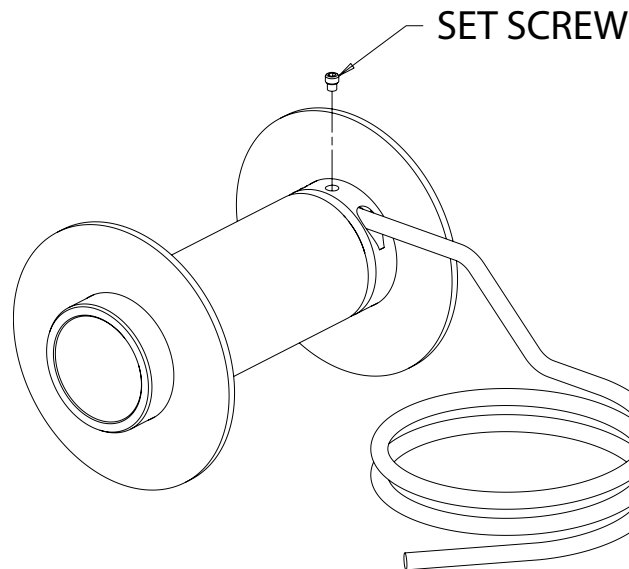
1. Insert the end of the wire rope into the anchor hole in the drum tube. **NOTE:** A small piece of tape around the end of the wire rope will make installation much easier. The wire rope must extend to the other end of the hole.
2. Torque the set screw to 12-15 lb-ft (16-20 N-m). Do not overtighten as this may cause the screw threads to be damaged.
3. With the end of the rope securely installed, carefully wind the rope evenly onto the drum. Keep the rope under tension at all times.
4. Always maintain a minimum of five (5) wraps of rope on the drum. Fewer wraps may cause the end of the rope to pull free of the drum and drop the load.



WARNING

Failure to observe these instructions could lead to property damage, severe injury, or death.

- **Always** maintain a minimum of five (5) wraps of rope on the drum
- **Always** install rope in the direction specified on the drum rotation label, or brake will not function.
- **Always** use wire rope specified on the product data sheet.
- **Always** install rope according to the illustration below.



Anchoring Wire Rope on Drum

Operating Instructions



WARNING

Failure to observe these instructions could lead to property damage, severe injury or death.

Always watch for hazards from the cable, drum pinch points, uncontrolled loads, and rope or rigging under tension.

- Never put rope around an object and hook it back on itself. This will damage the rope.
- Never use winch with less than five (5) wraps of rope around winch drum. The cable anchor is not designed to hold the rated load. The rope may pull free and release the load with fewer than five wraps of rope on the winch drum.
- Never let the rope slip through your hands.

Safe Operating Procedures

NEVER:

- Never place any part of your body or clothing near rotating or moving parts. Rotating drum with rope under tension can create a pinch point.
- Never handle ropes or operate winch without wearing eye protection and heavy gloves.
- Never stand close to winch when operating. If rope breaks it can fly back with tremendous force.
- Never lift, pull, or otherwise transport people with winch.
- Never lift, pull, support or otherwise transport loads over people.
- Never attempt to pull loads greater than rated capacity of the winch.
- Never pull a load until it jams and causes the drum and motor to stall.
NOTE: The two conditions above produce excess load on the winch. Excess loads may cause winch, rope or structural failure. Excess loads can create undetectable damage, which may cause the winch to fail even when pulling loads within its rated capacity.
- Never allow hydraulic system, electric motor or mechanical brake to overheat.
- Never touch rope or rigging while pulling a load, while anyone is at controls, or while operating winch.

ALWAYS:

- Always make sure the rope spools in the right direction. Winches are equipped with an automatic brake and will not function if the rope spools off the drum in the wrong direction. **NOTE:** The rope spooling direction will accidentally be reversed if rope is run all the way out and re-spoiled in with control switch in power out" direction.
- Always inspect and carefully rewind rope after each use. Cuts, kinks, or frayed areas reduce the tensile strength of rope. Replace rope if damaged.
- Always keep the remote control away from drum, rope, or rigging.
- Always inspect the remote control pendant and cable for damage before using winch.
- Always inspect hydraulic system or electrical connections before using winch.
- Always stand clear of the rope and load during winch operation.
- Always make sure that other winch operators understand the potential hazards and have been trained in proper use of the winch.
- Always make sure that the controller and winch assembly are installed, operated, adjusted, and serviced by qualified personnel familiar with its construction and operation.

WARN Industrial Winches

Spooling Guidelines

Stretching Wire Rope

The life of a wire rope directly relates to its use and to the care it receives. A new wire rope must be “stretched” or spooled onto the drum under a load of at least 500 lb. (227 kg.). The objective of “stretching” is to produce tight even wraps on the inner and outer layers of the rope, thus preventing damage to the rope from binding and kinking.

To accomplish the stretching operation, follow the guidelines and safety precautions in the Basic Guide to Winching Techniques. Set up your vehicle and winch for a straight-line pull on flat ground. Spool out all but the last five wraps. Attach the rope to an anchor point or load. Operate the winch using the remote switch as you sit in the driver's seat keeping light pressure on the brake. Spool the final few feet of rope while gripping the hook with a hook strap.

Spooling Out

Freespooling is generally the quickest and easiest way to spool out wire rope. Before freespooling, power out enough rope to remove any tension the rope may be under. Disengage the clutch. Now freespool by manually pulling out enough wire rope for the winching operation. Always leave at least 5 wraps on the drum.

Spooling in Under Load

Never exceed the rated line pull of the winch.

Power in the wire rope evenly and tightly on the drum. This prevents the outer wire wraps from drawing into the inner wraps, binding, and damaging the wire rope.

Avoid shock loads when spooling by using the control switch intermittently to take up wire rope slack. Shock loads can momentarily far exceed the winch and wire rope ratings.

Spooling in Under No Load

Assisted - Have your assistant hold the hook with the hook strap putting as much constant tension on the wire rope as possible. While keeping tension, the assistant should walk toward the winch while you operate the control switch. Release the switch when the hook is 8 ft. (2.4 m.) from the fairlead opening. Spool in the remainder for storage.

Unassisted - Arrange the wire rope to be spooled so it will not kink or tangle when spooled. Be sure any wire rope on the drum is tightly and evenly layered. Spool enough wire rope to complete the next full layer on the drum. Tighten and straighten the layer. Repeat the process until the hook is 8 ft. (2.4 m) from the fairlead opening. Spool in the remainder for storage.

Spooling Remainder for Storage

Secure the hook to a suitable anchor point near the winch. Carefully power in the remaining wire rope, jogging the control switch to take up the last of the slack. Be careful to not over tighten or damage may occur to the wire rope or anchor point.

Periodic Preventive Maintenance

- Keep winch free of dirt, oil, grease, water and other substances. Remove any overflow grease from bearings.
 - Check all mounting bolts and make sure they are tightened to proper torque. Replace any damaged fasteners.
 - Periodically check all connections to be sure they are tight and free of corrosion
 - Check rope for visible damage every time winch is operated. Examples of damage are: cuts, knots, mashed or frayed portions, and broken strands. Replace rope immediately if damaged. Failure to replace a damaged rope could result in breakage.
 - If the winch drum creeps or slips under load after the controls are released, the brake may need to be replaced.
 - This will ensure proper performance and extend the life of the winch. If winch seems to labor or get excessively hot during the lowering of loads, the brake will need to be serviced or replaced.
 - Check motor brushes periodically and replace when necessary.
- NOTE:** Only the motor bushes and brake assembly require periodic replacement.

Preventive Maintenance Schedule

Maintenance activity	After first operation	Before each use	Semi-annually or after each 25 hours of operation
Check fasteners	X		X
Check electrical or hydraulic connections	X		X
Spool out and check rope		X	
Check motor brushes			X
Visual check of winch and control	X	X	X

NOTE: Hydraulic system failures typically follow the same pattern: a gradual or sudden loss of pressure or flow resulting in a loss of motor power. Any one of the system components may be at fault. Refer to the table for general recommendations. If necessary, consult a knowledgeable hydraulics representative.

NOTE: See product data sheet for hydraulic specifications.

WARN Industrial Winches

Trouble Shooting:

NOTE: These trouble shooting tips apply to both electrical and hydraulic winches except where notes.

WARNING

PERSONAL INJURY

Failure to observe these instructions could lead to severe injury or death.

Never use a relief valve that exceeds the hydraulic motor pressure rating. Use of this valve can overload the winch.

WARNING

PERSONAL INJURY

Failure to observe these instructions could lead to severe injury or death.

- Never lean over battery while making connections.
- **Always** disconnect all wires from battery, before beginning work.
- **Always** disconnect negative terminal first and reconnect negative terminal last.
- **Always** remove jewelry and wear eye protection.

Problem	Possible cause	Corrective action
Winch does not hold load when stopped	Rope is wound backwards on drum.	Remove all rope and respool in the direction indicated by the drum rotation label.
	Load exceeds winch rating.	Refer to the product data sheet for the correct line pull rating for your winch.
	Brake is badly worn or broken	Replace brake. NOTE: Entire brake assembly must be replaced.
Difficulty unspooling rope	Bent flange on drum	Rotate drum and inspect for bent flanges. Bent drum must be removed and repaired.
	Worn drum bushings	Remove drum. Inspect bushings and replace if necessary.
	Clutch is damaged.	Remove and inspect clutch ring gear, clutch shaft, & gear housing for burrs and rub marks. Remove burrs with file or grinder. Replace parts if necessary.
	Rope is bound up on the drum.	Connect the winch to a load and alternately power-in and power-out. The rope will usually work itself free. USE EXTREME CAUTION
	Drum binds, because improper mounting causes the winch to twist.	Remount the winch following specifications and procedures in this manual. Be sure mounting surface is flat to within .020 inch. Use shims if necessary. Be sure all mounting bolts are tight.
	Ring gear does not rotate smoothly due to corrosion	Disassemble gear train. Inspect and clean sliding ring gear. Replace if necessary. Apply light oil to machined surfaces.
Ring gear does not rotate smoothly due to grease contamination	Disassemble gear train. Clean all grease from machined surface of gear housing and ring gear. Apply light oil on machined surfaces.	

WARN Industrial Winches

Problem	Possible cause	Corrective action
Winch lacks power, pulls slowly, stalls or will not run at all.	Ground cable not connected correctly	Connect ground cable to threaded hole in motor housing and to negative pole of battery - NOT to the contactor.
	Cables incorrectly sized	Replace power leads and ground lead with larger sized cable (larger gauge wire).
	Loose connections on battery or motor terminals.	Be sure all connections are tight.
	Vehicle battery not fully charged.	Charge battery.
	Battery terminals are corroded.	Clean terminals.
	Battery is too small or defective.	Replace with conventional automotive battery - 650 cold cranking amps minimum.
	Contactor mounting plate is not adequately attached to winch motor or winch mounting plate	Attached contactor mounting plate to winch motor, winch motor plate or other locations grounded to same electrical source as winch.
	Short circuit in winch power supply or wiring.	Check all battery and motor cable leads for loose connections, worn or cracked insulation, fraying or bare spots. Replace cable if necessary.
	Remote control switch or cord is damaged or defective.	Use a multimeter to check remote control switch for continuity in both the IN and OUT position.
	Hydraulic fluid pressure too low or flow rate too low	Check fluid level, filter, valves and other components. Consult a hydraulic specialist.
Operation of the remote switch produces only a "clicking sound"	Faulty electrical grounding	Connect ground cable to motor housing and to negative pole of battery - NOT to the contactor. Mount contactor to winch motor, winch motor plate or other locations grounded to the DC power source.
	Faulty battery, battery cable or cable connections.	Inspect and replace as needed
	Electrical short in motor caused by water, improper installation, or lack of motor vent fitting.	Replace motor.
	Worn or damaged motor brushes	Replace motor brush assembly.

WARN Industrial Winches

Problem	Possible cause	Corrective action
Electrical sparks appear around the motor adapter or screw heads.	See electrical problems already listed	See corresponding Corrective Action.
	Electrical ground is not sufficient. Ground wire was not installed, or the battery ground wires and wire terminals are corroded	Install a ground wire to the motor housing, and attach to the negative terminal of the battery.
Winch operates only in one direction.	Remote control switch is damaged	Use multimeter to check continuity of remote control switch and cable in all switch positions. Replace remote control pendent if necessary. Check all connections inside control pack. Check all pins in plug and receptacle to be sure that they are the same length.
	One of the contactors in the control pack is sticking or is damaged from prolonged use	Replace contactor.

Customer Support

Should you have any questions about this product or these instructions, please call WARN's customer service through the numbers below, Monday thru Friday between 7:00 AM and 4:00 PM Pacific Time for assistance. Or for e-mail support, visit our web site www.WARN.com and click on customer service section.

NOTE: Only qualified persons should undertake repair activities on WARN winches.

United States	International
Phone: 503-722-1200 or 800-543-9276 (US only)	Phone 503-722-3008
FAX: 503-722-3000	FAX: 503-722-3005

WARN Industrial Winches

Warranty

WARN® Commercial Products Limited One (1) Year Warranty Statement

Warn Industries, Inc. (WARN) warrants to the original purchaser that the mechanical components and electrical components of the "WARN" Products specified below will be free of defects in material and workmanship for a period of one (1) year from the original date of purchase. This Warranty applies only to the original purchaser of the Products. To obtain any warranty service, you must provide WARN with proof of purchase and date of purchase acceptable to WARN, such as a copy of your purchase receipt. This warranty does not cover the removal or reinstallation of the Product. WARN will, at its option, repair, replace or refund the purchase price of a defective Product or component, provided you return the defective Product or component during the warranty period, transportation charges prepaid, to Warn Industries Service Department or a Factory Authorized Service Center. Attach your name, address, telephone number, a description of the problem, and a copy of your receipt and original bill of sale bearing the WARN serial number of the defective Product and date of purchase.

This warranty does not apply (i) to parts or components excluded below, or (ii) if the Product has been damaged by accident, abuse, misuse, collision, overloading, modification, misapplication, improper installation, or improper service. This warranty is void if any WARN serial number has been removed or defaced.

THE WARRANTY SET FORTH ABOVE IS THE ONLY WARRANTY. THERE ARE NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

ANY IMPLIED WARRANTY WHICH BY LAW MAY NOT BE EXCLUDED IS LIMITED IN DURATION TO ONE (1) YEAR FROM THE DATE OF ORIGINAL RETAIL PURCHASE OF THE PRODUCT.

WARN SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, LOST PROFITS, DOWN TIME OR LOSS OF USE) UNDER ANY LEGAL THEORY, EVEN IF WARN WAS ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Some states do not allow the exclusion of implied warranties or the exclusion or limitation of liability for incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights. You may also have other rights that vary from state to state.

WARN reserves the right to change Product design without notice. In situations in which WARN has changed a Product design, WARN shall have no obligation to upgrade or otherwise modify previously manufactured Products.

No WARN dealer, agent or employee is authorized to make any modification, extension or addition to this warranty.

Warranty inquires and Products returned for warranty service should be sent to:

WARN INDUSTRIES, INC.
Customer Service Department
12900 SE Capps Road
Clackamas, OR 97015
1-800-543-WARN (1-800-543-9276)

Products covered by this warranty
Commercial winch products
Commercial hoist products
Commercial accessory products

Products not covered by this warranty
Finish and wire rope for commercial winches
Finish and wire rope for commercial hoist products
Finish and wire rope