

Winch Installation Guide



This manual provides important safety information and instructions on how to operate your winch. It is important to read **ALL** instructions and safety information **BEFORE** installing and operating your winch.

As you read these instructions, you will see **WARNINGS**, **CAUTIONS**, **NOTICES** and **NOTES**. Failure to observe these instructions could lead to serious injury or death. **WARNINGS** are safety messages that indicate a potentially hazardous situation which, if not avoided, could result in serious injury or death. **CAUTIONS** are safety messages that indicate a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. **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!**

SAVE THIS MANUAL and other product literature for future reference and review frequently for continuing safe operation.

Instruct all users of this product to review this manual before operating this product.

Additional Product Literature Available Online:

- **Basic Guide to Winching Techniques**
 - Provides a basic understanding of the winch and teaches basics of proper winching techniques. It is a valuable resource to help winch safely and efficiently.
- **Product Specification and Performance Data**
 - Provides product specifications, performance data and replacement parts information.
- **Other product literature specific to some products**

Go to <https://www.warn.com> for additional or replacement product literature available to view/download.

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KNOW YOUR WINCH

Before you begin, you should familiarize yourself with your WARN winch and each of its components.

Types of Winch

Electric

For electrically-powered applications, WARN Industrial offers a comprehensive line of products to meet or exceed your expectations. All electric winches feature heavy-duty 12- or 24-volt Series Wound industrial motors and hardened steel three-stage planetary gear trains that provide efficient and reliable operation.

Hydraulic

For hydraulic winching applications, no product performs better than a WARN Industrial winch. Powerful hydraulic motors allow for extended duty. Hardened steel, two-stage planetary gear trains deliver efficient and reliable operation plus fast line speeds. Like their electric cousins, these products comply with world-wide quality and safety standards.

⚠️ WARNING Never exceed the maximum recommended hydraulic pressure or flow for any of the components used.

⚠️ WARNING Always use a tandem-center type control valve (A & B work ports blocked) to insure proper brake operation.

⚠️ WARNING Always make sure all hydraulic system components are functioning correctly.

⚠️ WARNING Never use a standard motor valve.

Winch Configuration Definition

All SeriesG2 winches will have a reference I.D. made up of custom configurations. Below is a reference table defining each configuration notation.

Characterization	Configuration Notation	Configuration Notation Description
Model Type	SG2	Series G2 Winches
	SVDG2	Severe Duty Series G2 Winches
Capacity	09	9,000 lbs. Rated Load
	12	12,000 lbs. Rated Load
	15	15,000 lbs. Rated Load
	18	18,000 lbs. Rated Load
Drum Rotation	A	Anticlockwise Rotation (Viewed from Motor End)
	C	Clockwise Rotation (Viewed from Motor End)
Motor Type	E00V	No DC Motor
	E12V	12V DC Motor
	E24V	24V DC Motor
	X.XH	X.X cu. in. Hydraulic Motor

Characterization	Configuration Notation	Configuration Notation Description
Drum Length	06DL	6.5" Drum, 8.5" Mounting Feet Width
	08DL	8.0" Drum, 10" Mounting Feet Width
	10DL	10" Drum, 12" Mounting Feet Width
	12DL	12.5" Drum, 14.5" Mounting Feet Width
Drum/Rope Type	WRXX	Wire Rope Code
	SRXX	Synthetic Rope Code
Clutch Type	MC	Manual Clutch
	AC	Air Clutch
	RC	Remote Clutch
	PC	Plugged Clutch

Reference ID Examples

- SG2 12-A-E12V-10DL-WR00-MC: (SeriesG2; 12,000 lbs. Rated load; Anti-Clockwise Rotation; 12V DC Motor; 10" Drum, 12" Mounting Feet Width; Without Wire Rope; Manual Clutch)
- SVDG2 12-A-E24V-06DL-WR01-MC: (Severe Duty SeriesG2; 12,000 lbs. Rated load; Anti-Clockwise Rotation; 24V DC Motor; 6.5" Drum, 8.5" Mounting Feet Width; With Wire Rope; Manual Clutch)

Pre-Install Checklist

- Check to see that you have received the following:
 - The winch
 - The control pack (*electric only*)
 - The remote control pendant (*electric only*)
 - The winch mounting hardware
 - Product data sheet
- Upon removing winch from packaging, check for damage including bent or cracked tie rods, tie bars, or housings. If any damage is found, please contact WARN Customer Service at the numbers or email address listed below:
 - Customer Service (North America) 800.543.9276
 - Customer Service (Outside North America) 503.722.1200
 - Customer Service/Tech Support: cs@warn.com
- Make sure the environment surrounding winch and control pack is free of:
 - Combustible vapors
 - Chemical fumes
 - Oil vapors
 - Corrosive material
- Make sure that the air temperature surrounding the winch and control pack stays within 158° F (70° C) and -40° F (-40° C).

Mount the Winch

CAUTION To prevent accidental activation of the winch and serious injury, complete the winch installation and attach the hook before installing the wiring.

WARNING Always choose a mounting location that is sufficiently strong enough to withstand the maximum pulling capacity of your winch.

WARNING Always be certain the anchor you select will withstand the load and the strap or chain will not slip.

Choose a mounting location that is sufficiently strong enough to withstand the maximum pulling capacity of your 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 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.

- Make sure that the mounting surface is flat within +/-0.02 in. (0.5 mm). If the surface is

WARNING Never use bolts that are too long.

WARNING Always spool the winch rope onto the drum in the direction specified by the drum rotation labels on the winch and/or in the documentation. This is required for the automatic brake (if so equipped) to function properly.

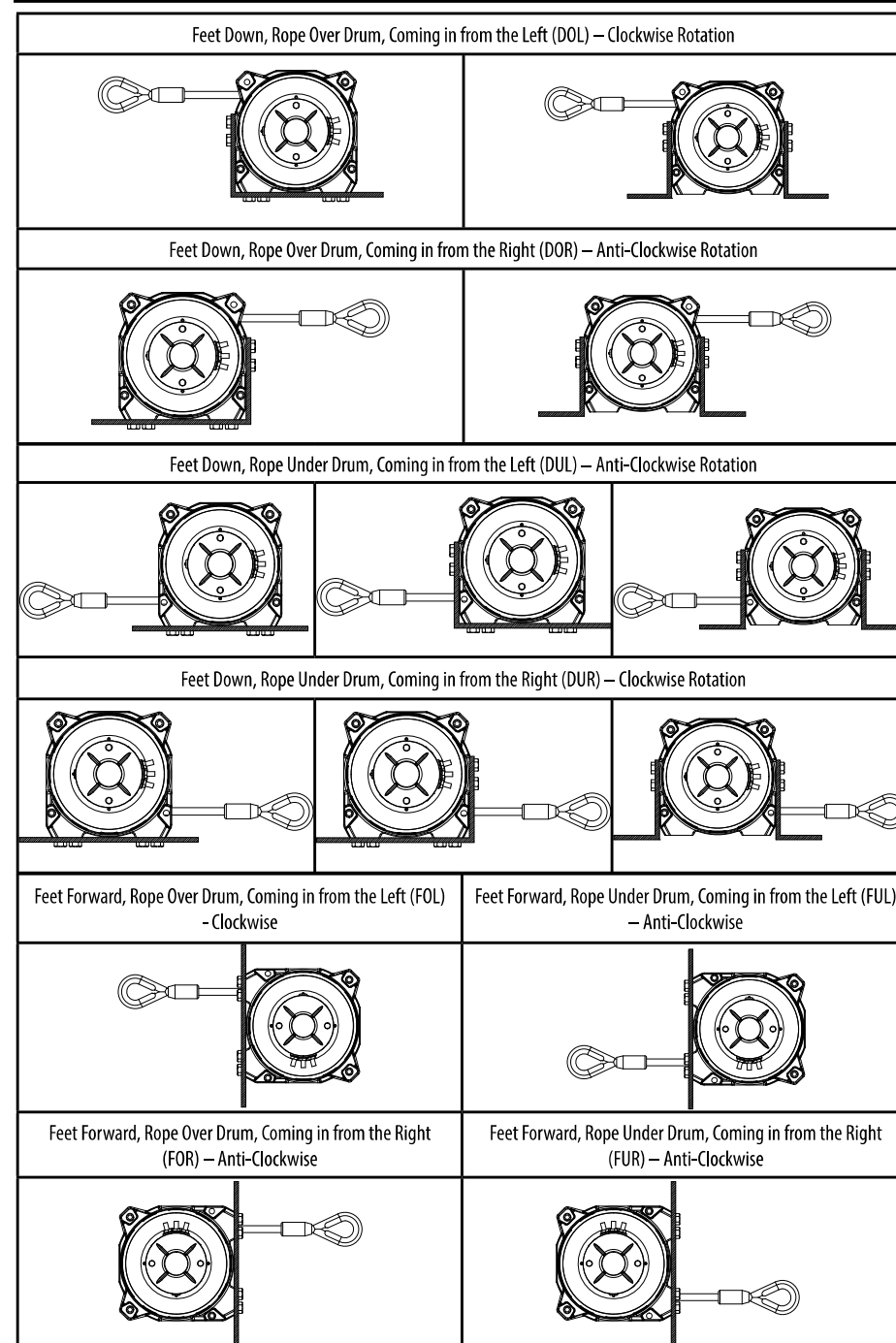
not flat, use shim stock as needed to avoid straining the winch.

- Use the mounting bolt locations referenced on page 4 (*Mounting Configurations*).
- Torque all mounting bolts to the recommended values on the product data sheet.

WARNING Always confirm required bolt length to ensure proper thread engagement.

Mounting Configurations

All Mounting configurations viewed from motor end



ELECTRICAL CONNECTIONS

Install the Wiring

⚠ WARNING To prevent serious injury or death. Always place the supplied terminal boots on wires and terminals as directed by the installation instructions.

⚠ WARNING To prevent serious injury or death from electrical fire:



Never route electrical cables across sharp edges.



Never route electrical cables near parts that get hot.



Never route electrical cables through or near moving parts.



Avoid pinch and wear/abrasion points when installing all electrical cables.

⚠ WARNING Always insulate and protect all exposed wiring and electrical terminals.

Connection guidelines:

- Use #2 gauge battery cable for all power connections. Excess cable length can result in a voltage drop causing poor winch operation.

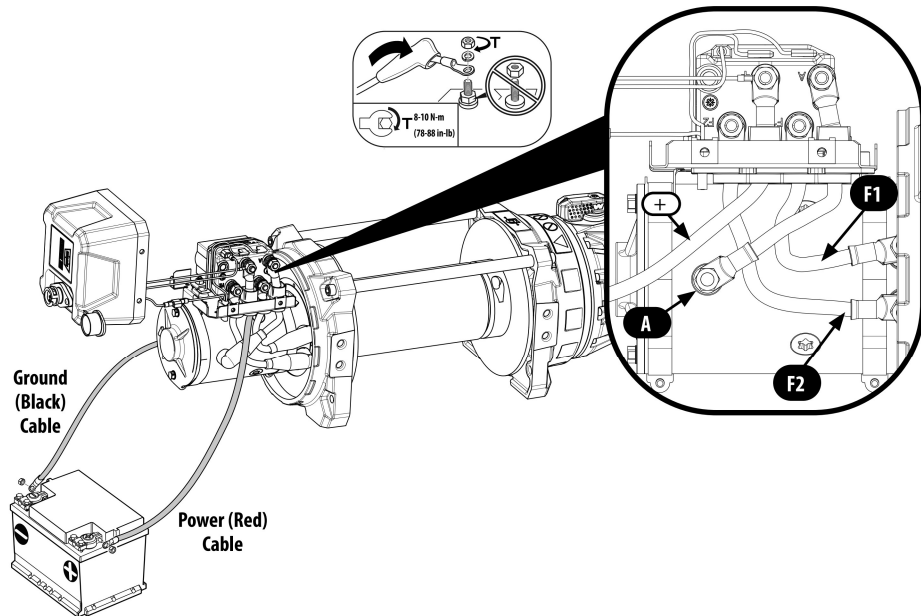
BATTERY CABLE GAUGE RECOMMENDATIONS	
0 - 1.5 M (0 - 5 ft.)	2 GAUGE
1.5 M - 6 M (5 - 20 ft.)	1 GAUGE
Over 6 M (20 ft.)	0 GAUGE

- 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.
- Install power leads:
 - Carefully remove control pack cover (without disconnecting remote socket terminals).
 - Connect power (red) cable to the (+) terminal or contactor. Torque cable nut to 8-10 N-m, (78-88 in-lb).
 - Place control pack cover back on top and fasten fasteners.
 - Connect ground (black) cable to the motor ground bolt. Torque cable nut to 8-10 N-m, (78-88 in-lb).
- Make sure all electrical connections are clean and tight.

⚠ WARNING Always connect red (+) power cable ONLY to the positive (+) terminal of the battery.

⚠ WARNING Always connect black ground (-) power cable ONLY to the negative (-) terminal of the battery.

⚠ WARNING Never connect red (+) power cable to the negative (-) terminal of the battery.



ROPE INSTALLATION

Installing the Winch Rope

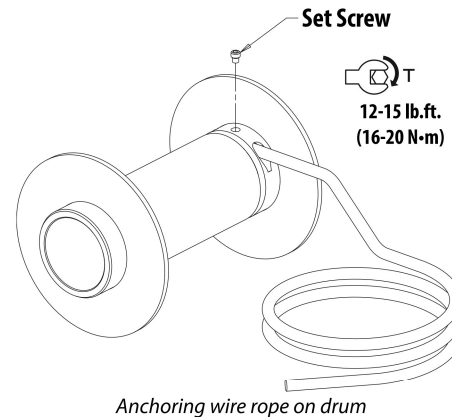
WIRE ROPE

⚠ WARNING Always install rope in the direction specified on the drum rotation label, or brake will not function.

⚠ CAUTION Always use winch rope specified on the product data sheet.

⚠ CAUTION Always install rope according to the illustration below.

- Disconnect the negative cable from the battery that is used to power the winch.
- Install the wire rope by pushing 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.**
- Extend the wire rope to the other end of the anchor hole. Torque the set screw to 12-15 lb.ft. (16-20 N-m). **Do not over tighten, as this may cause the set screw threads to be damaged.**
- With end of rope securely installed, carefully wind rope evenly onto drum. Keep rope under tension at all times.
- 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.



SYNTHETIC ROPE

NOTICE The following steps are very important and if not precisely followed, the life of the winch and winch rope may be compromised.

⚠ WARNING Always replace the fairlead if damaged or abused with a WARN fairlead that is recommended for synthetic rope.

⚠ WARNING Always keep hands clear of winch rope, hook loop, hook and fairlead opening during installation, operation, and when spooling in or out.

For synthetic winch rope applications, you must have a hawse fairlead mounted to your winch. For optimal performance, a WARN hawse fairlead is strongly recommended. If you need to purchase a new WARN hawse fairlead, contact your WARN product dealer.

- Disconnect the negative cable from the battery that is used to power the winch.

⚠ WARNING Never bend winch rope around unprotected, sharp corners.

⚠ WARNING Never use synthetic rope over rough surfaces without abrasion protection.

- Mount the Warn hawse fairlead to the winch mount using the supplied hardware.

⚠ WARNING Always position fairlead with warning readily visible on top.

- Slide the abrasion sleeve over the winch rope from the looped end (opposite the hook end) and slide the sleeve back towards the hook end of the winch rope.

- Insert the looped end of the winch rope through the fairlead and around the winch drum in the direction specified by the drum rotation labels on the winch.

- Insert the bushing into the loop of the winch rope and slide loop into the opening of the rope anchor clip.

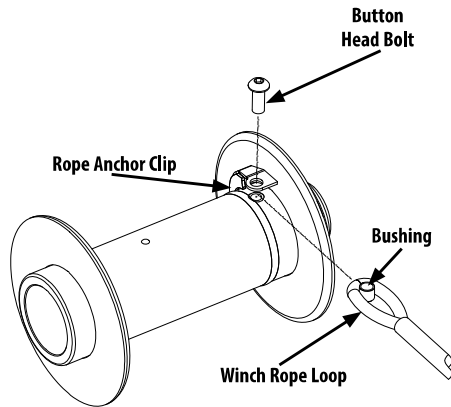
- Insert the button head bolt through the rope anchor clip and bushing to secure winch rope loop to drum.

- Torque the fastener to 60-90ft-lbs (80-120 N-m).
- Reconnect negative cable to the battery that is used to power the winch.

⚠ WARNING Never operate winch with less than 5 wraps of wire rope or 10 wraps of synthetic rope around the drum. Winch rope could come loose from the drum, as the rope attachment to the drum is not designed to hold a load.

⚠ WARNING Never touch winch rope or hook while someone else is at the control switch or during winching operation.

- Turn the clutch lever on the winch to the "Engaged" position.
- Power in and wind at least 10 wraps of winch rope onto the drum while applying tension on the winch rope.



System Check

Once you have performed a system check, you are ready to confirm winch function.

- Recheck mounting hardware for loose bolts, etc.
- Be sure all hydraulic system components and connections are correct
- Be sure all connections are tight and secure
- Check motor rotation: The drum should rotate in the direction specified by drum rotation labels on the winch and /or in documentation. This is required for the automatic brake (if so equipped) to function properly.
- To ensure maximum hydraulic motor life, the winch should be operated for one hour at no more than 30% of rated load before application of full load.

First Time Operating Instructions

In this section, we'll show you the first time operating instructions for effective basic winching. For complete winch operation and techniques read the Basic Guide to Winching Techniques found online at: <https://www.warn.com>.

⚠ WARNING Never use winch as a hoist or to suspend a load.

⚠ WARNING Never use winch to lift or move persons.

⚠ WARNING Never use winch or winch rope for towing. Shock loads can damage, overload and break rope.

⚠ WARNING Never use vehicle to pull load on winch rope. Combined load or shock load can damage, overload and break rope.

REMOTE CONTROL

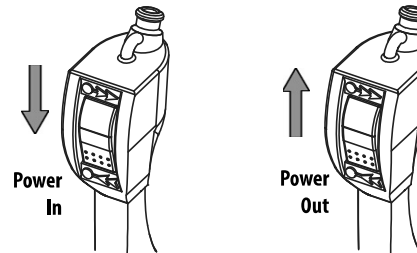
⚠ WARNING Always keep wired remote control lead and power cord clear of the drum, rope, and rigging. Inspect for cracks, pinches, frayed wires or loose connections. Damaged components must be replaced before operation.

⚠ WARNING Never leave remote control where it can be unintentionally activated.

⚠ WARNING Never leave the winch remote control plugged in when installing, freespooling, rigging, servicing or when the winch is not being used.

The winch is controlled by the hand held remote control. The remote control provides control of the power-out (forward) or power-in (reverse) rotation of the spooling drum.

Heavy duty water resistant remote control pendant



⚠ WARNING Never use remote when vehicle is not in line of sight of operator.

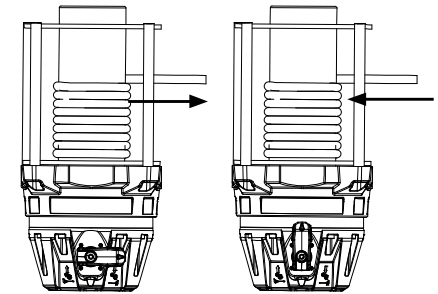
CLUTCH OPERATION

⚠ WARNING Never engage or disengage clutch if winch is under load, winch rope is in tension or drum is moving.

NOTICE Always ensure the clutch is fully engaged or disengaged when operating winch.

When the clutch is engaged, the gear train is coupled to the winch drum and power can be transferred from the winch motor. When the clutch is disengaged the drum is in the freespool position and the gear train and winch rope drum are uncoupled allowing the drum to rotate freely.

The clutch lever, located on the winch housing opposite the motor, controls the clutch position. To prevent damage, always fully engage or fully disengage the clutch lever.



DISENGAGED/UNLOCK ENGAGED/LOCK

SPOOLING OUT

⚠ WARNING Never operate winch with less than 5 wraps of wire rope or/10 wraps of synthetic rope around the drum. Rope could come loose from the drum.

⚠ WARNING Always keep hands clear of winch rope, hook loop, hook and fairlead opening during installation, operation, and when spooling in or out.

⚠ WARNING Always wear heavy leather gloves when handling winch rope.

Freespooling is generally the quickest and easiest way to spool out winch rope. Before freespooling winch rope out from the winch, power-out enough rope to remove any tension the winch rope might be under. Disengage the clutch. Then freespool by manually spooling out enough winch rope for

the winching operation. See The Basic Guide to Winching Techniques for more information, found online at: <https://www.warn.com>.

NOTICE Do NOT power out more than 30ft without allowing the winch to cool for 20 minutes before powering rope back in. Instead, place the clutch in freespool and pull the rope out by hand.

WARNING Always use hook strap strap (if supplied) when spooling winch rope in or out.

SPOOLING IN UNDER LOAD

WARNING Never exceed winch or winch rope rated capacity.

WARNING Always remove any element or obstacle that may interfere with safe operation of the winch.

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

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

SPOOLING IN UNDER NO LOAD

WARNING Never touch winch rope or hook while someone else is at the control switch, when winch rope is under load or during winching operation.

Spooling with an Assistant: Have the assistant hold the hook strap putting as much constant tension on the winch rope as possible. While keeping tension, the assistant should walk toward the winch while you operate the control switch spooling in the winch rope. Release the switch when the hook is a minimum of 6 ft. (2m) from the fairlead opening.

Spool in the remainder for storage as directed below.

Spooling Alone: Arrange the winch rope to be spooled so it will not kink or tangle when spooled. Be sure any winch rope on the drum is tightly and evenly layered. Spool enough winch rope to complete the next full layer on the drum. Tighten and straighten the layer. Repeat process until the hook is a minimum of 6 ft. (2 m) from the fairlead opening.

SPOOLING REMAINDER FOR STORAGE

When the hook is within 6 ft. (2 m) of the fairlead, disconnect the hook from the anchor or load. Hold onto the supplied hook strap and hold tension on the winch rope. Slowly power-in the winch by “pulsing” the power-in switch on the remote control until the hook is within 3 ft. (1 m) of the fairlead.

Stop winching in and attach the hook to a suitable anchor point on the vehicle.

NOTICE Do not power the hook into the fairlead. This could cause damage to the fairlead.

Once the hook is suitably attached to the vehicle, power-in the remaining slack in the winch rope by “pulsing” the power-in switch on the remote control until there is minimal slack in the winch rope.

STRETCHING WINCH ROPE

WARNING Always prestretch rope and respool under load before use.

WARNING Always inspect winch rope, hook, and slings before operating winch. Frayed, kinked or damaged winch rope must be replaced immediately. Damaged components must be replaced before operation. Protect parts from damage.

Stretching (tensioning) the winch rope is critical to ensure a long product life. Tensioning the winch rope will prevent outer layers of winch rope from pinching and deforming the inner layers.

During its first use, a new winch rope must be spooled onto its drum under a load of at least 1000 lbs. (454 kgs).

Use the following instructions to properly stretch the winch rope onto the winch drum.

WARNING Always wear heavy gloves when handling winch rope.

1. Choose a **FLAT AND LEVEL** location that is large enough to run out almost the entire length of winch rope.
2. Disengage clutch.

WARNING Always keep hands clear of winch rope, hook loop, hook and fairlead opening during installation,

operation, and when spooling in or out.

3. Grasp hook strap and spool out the winch rope to the last 5 wraps on the drum (10 wraps if synthetic rope).
4. Be sure to check that the winch rope is winding off of the bottom of the drum or the automatic load holding brake will not function properly. **NOTE: If the winch rope is winding off the top of the drum, you have powered the winch “out” instead of “in”. Be sure you are powering in.**

NOTICE For proper function of the winch brake, the winch rope must be spooled onto the drum in the specified direction. *See drum rotation label located on winch.

5. Once the winch rope is spooled out, engage clutch.

WARNING Always ensure hook latch is closed.

WARNING Always use a hook with a latch or closed rigging components.

WARNING Always apply load only to the center of hook.

WARNING Never apply load to hook tip or use hook that is bent or twisted.

6. Attach the hook end of the rope to a suitable anchor point.

WARNING Always remove any obstacle that may interfere with safe operation of the winch.

WARNING Never wrap winch rope back onto itself. Use a chain or strap on the anchor.

WARNING Always be certain the anchor you select will withstand the load and the strap or chain will not slip.

7. Return to your vehicle.
 8. Back the vehicle away from the anchor point until there is very little slack in the winch rope.
 9. Set the parking brake, place the vehicle in gear or park and turn the vehicle off.
- WARNING** Always stand clear of winch rope and load and keep others away while winching.
10. Exit vehicle. **WARNING! Never exit the vehicle with a load on the winch rope.** While standing approximately 8 ft. (2.44 m) away from the winch, power-in the winch until all of the

slack is wound onto the winch drum.

WARNING Never touch winch rope or hook while someone else is at the control switch, when winch rope is under load or during winching operation.

WARNING Never let winch rope slip through your hands.

11. With gloves on, hold tension on the winch rope with one hand; carefully push the winch rope to the side of the drum the winch rope is attached to so there are no gaps between each coil on the drum.
12. The following steps should be done using two people for proper safety. If you attempt to tension your winch rope alone be sure to always set the parking brake, place the transmission in gear or park and turn the vehicle off every time you exit the vehicle to inspect the winch rope.

NOTICE Use care to evenly wrap each layer to prevent damage to the rope.

WARNING Never use remote when vehicle is not in line of sight of operator.

13. The driver of the vehicle should operate the winch.
14. Instruct your assistant to stand to the side of the vehicle and away from the winch rope. **NOTE: Your assistant should signal you if the winch rope is winding correctly or incorrectly by watching it move across the fairlead as the winch rope is powered in.**
15. Start the vehicle and place the transmission in neutral. Then release the parking brake while applying moderate brake pedal pressure.
16. Power-in the winch rope to start winching in.
17. After winching in for approximately 6 ft. (2 m), stop winching.
18. Slowly let up off of the brake pedal and then apply the parking brake. This will ensure that there is no load on the winch rope.
19. Place the transmission in park or in gear and turn the vehicle off.
20. Exit the vehicle and inspect the winch to

make sure that the winch rope is being evenly wound onto the winch drum and not sinking into the lower layer. If the winch rope is sinking, power-out the winch rope by pushing the power-out button on the remote control and repeat this step from the beginning with more brake pedal pressure.

21. When you are convinced the winch rope is winding onto the winch drum properly, repeat steps until the vehicle is within 6 ft. (2 m) of the winch anchor. Once within 6 ft. (2 m), slowly let up off of the brake pedal and then apply the parking brake. This will ensure that there is no load on the winch rope. Then place the transmission in park or in gear and turn the vehicle off.
22. Exit the vehicle. Disconnect the hook from the anchor.
23. While holding onto the supplied hook strap, hold tension on the winch rope and slowly power-in the winch by "pulsing" the power-in button on your remote control until the hook is within 3 ft. (1 m) of the fairlead.
24. Stop winching in and attach the hook to a suitable storage point on the vehicle.
25. Once the hook is suitably attached to the vehicle, power-in the remaining slack in the winch rope by "pulsing" the power-in button on your remote control until there is minimal slack in the winch rope.

NOTICE Do not power the hook into the fairlead. This could cause damage to the fairlead.

RIGGING

For complete rigging fundamentals, Read the Basic Guide to Winching Techniques, found online at <https://www.warn.com>.

Hydraulic System Information

WARNING Do not exceed the maximum recommended hydraulic pressure or flow of any of the components used.

WARNING The winch control valve must be a tandem center type valve (A & B work ports blocked) to insure proper brake operation. Failure to use proper control valve could cause brake failure resulting in serious injury or property damage.

WARNING THE WINCH WORKS CORRECTLY ONLY WHEN HYDRAULIC SYSTEM COMPONENTS ARE CORRECT.

NOTE: The pictorial diagram and the following descriptions are intended only as a general guide for reference use. For specific recommendations on component selection, inter-connection, layout, and use, consult a knowledgeable hydraulics representative.

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 SSU at 15-45 °C.

HYDRAULIC SYSTEM

1. **STRAINER:** This removes larger particles from the hydraulic fluid.
2. **MOTOR:** This is the power source for the hydraulic system. It must be adequately rated to supply the required power. It can be a power take-off (PTO), belt drive from a gasoline or diesel engine, a large electric motor, etc.
3. **HYDRAULIC PUMP:** This converts the mechanical power of the motor into hydraulic fluid power. It must be adequately rated to supply the system with enough power for proper performance (see the performance chart for required motor "flow inputs").
4. **PRESSURE RELIEF VALVE:** This is to limit the system pressure to a safe level (one which will not exceed the maximum pressure rating of any of the components used).

The pressure rating of the winch motor is determined by (a) the maximum allowable

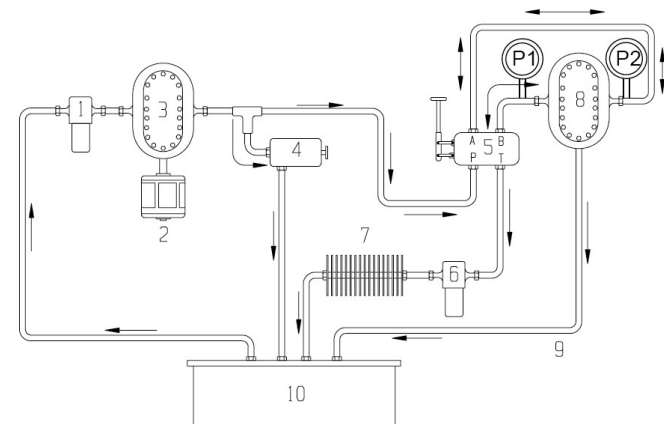
pressure at the motor inlet port and (b) the maximum allowable pressure drop across the motor. Pressure drop is defined as the difference between the inlet pressure (P1) and the outlet pressure (P2) at the winch motor (item 8 in the diagram). Exceeding the maximum inlet pressure may damage the motor. Exceeding the maximum pressure drop may cause failure of winch components. Maximum allowable values are shown in the following table.

5. **THREE POSITION VALVE:** This is a three-position tandem valve with a center-off position. In the center-off position, the pressure tank ports (labeled "P" and "T") are inter-connected, and the output ports (labeled "A" and "B") are blocked off. The blocked off ports will immediately stop the hydraulic motor rotation. This valve type is required for proper brake operation. This valve is used to control the three basic winch functions of "Power In", "Stop", and "Power out". It may be actuated either manually or electrically. Ensure that the valve is sufficiently rated for pressure and flow rate.

WARNING Do not use a standard motor valve.

6. **FILTER:** This removes the smaller particles and insoluble contaminants from the hydraulic fluid. Ensure that it is rated for an adequate flow rate. The recommended filtration level is 10 microns nominal or finer.

7. **HEAT EXCHANGER:** This is a device to remove excess heat from the hydraulic fluid. This is an optional device that will be required only if excess heat buildup is a problem due to a small reservoir size, restricted hydraulic fluid flow, extended operating periods, etc.
8. **HYDRAULIC MOTOR:** This supplies power to the winch. The recommended operating temperature range 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 Hydraulic Winch Data)
9. **MOTOR CASE DRAIN LINE:** A motor case drain line will be not required in most cases. Warn supplied industrial motors do not require a case drain line unless the motor outlet port (the port connected through the three-position valve back to the reservoir) pressure exceeds 124 bar (1800 psi). This will alternately be either port "A" or "B" at the three-position valve depending on the positioning of the valve at either "power in" or "power out". Check outlet port pressure in both positions.
10. **RESERVOIR:** The reservoir is the container for storing the hydraulic fluid. Its function includes storing all the required fluid, helping to moderate fluid temperature, and solid contaminants. The reservoir can also act to heat fluid for viscosity control in cold weather.



Winch 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 hydraulic 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 winch drum continues to turn after controls are released, brake may need to be replaced.

Check	Before first Operation	After Each Use	Monthly	Semi-Annually	Yearly
Take time to fully read the Instructions and/or Operations Guide, and/or Basic Guide to Winching Techniques, in order to understand your winch and its operations	X				
Check fasteners and make sure they are tight and to proper torque.	X			X	X
Replace damaged fasteners	X	X	X	X	X
Check electrical connections.	X			X	X
Verify wiring to all components is correct and be certain that all connections are tight	X			X	X
Verify there is no exposed/bare wiring, terminals or cable insulation damage (chafing, cutting).	X			X	X
Repair or replace damaged electrical cable.	X	X	X	X	X
Visual Check of winch and electrical connections to ensure all components are free from corrosion:	X			X	X
Check Quick Connects and Contact Leads	X			X	X
Check Motor-Sub Assembly (Contactor, Motor/ Motor Terminals, OLI).	X			X	X
Ensure Remote Socket and Remote control connections are not damaged	X	X	X	X	X
Check hydraulic connections	X			X	X
Visual check of winch and control valve	X			X	X

Rope Maintenance

CLEANING:

- Use low pressure water to clean synthetic rope. Do not use any chemicals.
- Do not direct high pressure water (pressure washers, car washes, etc.) directly between the drum support and drum flange or clutch lever.
- Use low pressure water and a soapy rag or sponge to clean the winch.
- Avoid using chemicals that may damage the finish.
- Thoroughly clean salt residue from the winch as soon as possible to minimize corrosion.

ROPE INSPECTION:

⚠ WARNING Always inspect winch rope, hook, and slings before operating winch. Frayed, kinked or damaged winch rope must be replaced immediately. Damaged components must be replaced before operation. Protect parts from damage.

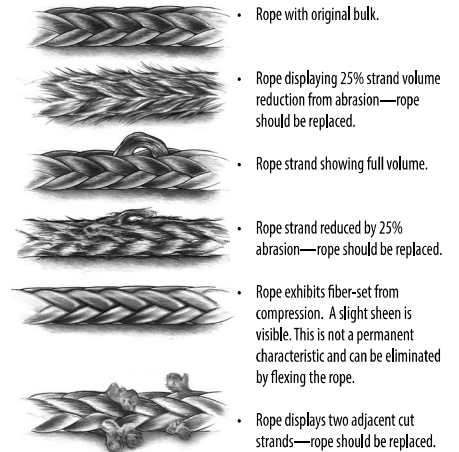
When rope is first used, the outer filaments of the rope will quickly fuzz up. This is the result of these filaments breaking and this roughened surface will actually protect the fibers underneath. The condition should stabilize, not progress. If the surface roughness increases, excessive abrasion is taking place and strength is being lost.

Look closely at both the inner and outer fibers. When either is worn the rope is obviously weakened. Open the strands and look for powdered fiber—this is a sign of internal wear.

Localized discolorations could potentially represent chemical attack by anything from gear oil to battery acid. When doubt exists, replace the rope.

Rope should be replaced when:

- Rope bulk anywhere along the length is reduced by 10% or more by abrasion.
- Two or more adjacent strands are cut.
- Flat areas or lumps are found that are not eliminated by flexing rope.
- Excessive fused or melted fibers are found. Any such areas will be stiff and the rope will have a glazed appearance.



MAINTENANCE:

- Inspect the winch rope and heat sleeve before and after each winching operation. Frayed or damaged rope must be replaced immediately. See rope care and storage.
- The rope must always spool onto the drum as indicated by the drum rotation decal on the winch.
- Use winch cover to protect winch and synthetic rope when not in use. Prolonged exposure to ultraviolet rays from sunlight can degrade synthetic rope strength over time.
- Avoid using synthetic rope over any rough surfaces without abrasion protection.
- Keep winch rope free of moisture, grease, dirt or other debris. If necessary, clean with a damp cloth.

Always take time to fully understand your winch and the winching operation by reviewing the Operating instructions in this manual.

For further information or any questions contact:

WARN INDUSTRIES, INC.
12900 S.E. Capps Road, Clackamas
OR USA 97015-8903, 1-503-722-1200,
Customer Service: 1-800-543-9276
Dealer Locator Service: 1-800-910-1122
or visit www.warn.com.

TROUBLESHOOTING

Trouble Shooting (ELECTRIC WINCH):

Note: These trouble shooting tips apply to electrical winches.

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.
Vibration of rope	Rope wound on one side of the drum	Power-in rope evenly and tightly on the drum.
	Bird nesting	
	Bent tensioner	Replace tensioner.
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. Clean terminals and contact leads
	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 or motor sub-assembly (SVDG2 Winches Only)
	Worn or damaged motor brushes.	Replace motor or motor sub-assembly (SVDG2 Winches Only)

TROUBLESHOOTING

Trouble Shooting (ELECTRIC WINCH *continued*):

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 pendant if necessary. Check all connections inside control pack. Check all pins in plug and receptacle to be sure that they are the same length.
	Damaged Contactor	Replace Control Pack Assembly. Replace motor sub-assembly. (SVDG2 Winches Only)
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. Clean terminals and contact leads
	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. Replace if necessary.
	Battery is too small or defective.	Replace with conventional automotive battery - 650 cold cranking amps minimum.
	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.

TROUBLESHOOTING

Trouble Shooting (HYDRAULIC WINCH):

Note: These trouble shooting tips apply to hydraulic winches.

Note: Most hydraulic system failures follow the same pattern: a gradual or sudden loss of pressure or flow with a resulting loss of motor power. Any one of the system's components may be at fault. Refer to Operator's Manual for specific recommendations and specifications for your hydraulic system. For specific recommendations, consult a knowledgeable hydraulics representative. General hydraulic pressure recommendations are shown below:

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.
Vibration of rope	Rope wound on one side of the drum	Power-in rope evenly and tightly on the drum.
	Bird nesting	
	Bent tensioner	Replace tensioner.
System operates erratically	Air in system.	Check suction side of system for leaks. Repair or replace bad components.
	Hydraulic oil is too cold.	Allow adequate time for system to warm up.
	Components are dirty or damaged.	Clean or replace dirty or damaged components as necessary.
	Restriction(s) in lines or clogged filter(s).	Clean and/or replace filter, filter elements or lines.

TROUBLESHOOTING

Trouble Shooting (HYDRAULIC WINCH *continued*):

Problem	Possible cause	Corrective action
System is inoperable and won't run the winch.	No hydraulic oil, insufficient or incorrect hydraulic oil in the system	Fill reservoir with correct hydraulic oil. Check for leaks.
	Dirty, clogged or incorrect filter, hydraulic oil line restriction, dirty or collapsed lines.	If necessary, drain and flush system. Check for contaminated oil. Replace filter or filter element.
	Air leaks in pump suction line.	Repair or replace pump suction line.
	Worn or dirty pump, damaged or contaminated components.	Clean, repair or replace pump. Check alignment. Examine and test for internal or external leakage of components. Replace defective or worn components. Check and correct cause of wear.
	System leak in lines or components.	Check all components, particularly the relief valve, for proper settings.
	Excessive load.	Check unit specifications for load limits. Don't exceed these limits.
System operates slowly.	A slipping or broken pump drive.	Repair or replace worn or defective belts, couplings, etc. Check for proper alignment.
	Oil viscosity is too high,.	Change to lighter oil.
	Oil is too cold	Allow oil to warm up.
	Low pump drive speed.	Increase engine or motor speed. Check operator's manual for recommendations.
	Low oil level.	Check oil level and add oil if necessary.
	Air in system.	Check suction side for leaks. Repair or replace lines or components as necessary.
	Badly worn pump, valves, etc	Repair or replace components as necessary.
	Restriction in filters or lines.	Clean and/or replace filters, filter elements or lines.
	Improper adjustments	Check relief valves, etc. Adjust as per manual
Oil leaks.	Replace seals or damaged lines.	
Oil in system is overheated	Oil passing through relief valve for long periods.	Return control valve to neutral when not in use.
	Incorrect oil, low oil or dirt oil in system.	Use recommended oil, fill reservoir, clean oil or flush system and replace.
	Engine running too fast.	Reduce engine speed.
	Excessive internal leakage in component(s).	Repair or replace bad components as necessary.
	Restriction in filters or lines.	Clean and/or replace filters, filter elements or lines.
	Malfunctioning oil cooler	Clean and/or repair oil cooler.
	Insufficient heat radiation.	Clean dirt and sludge from reservoir and components.
	Bad component(s).	Repair or replace bad components.
	Oil reservoir too small.	Increase oil reservoir size.

Trouble Shooting (HYDRAULIC WINCH *continued*):

Problem	Possible cause	Corrective action
Foaming oil.	Incorrect, low or dirty oil	Replace, clean or add oil as necessary.
	Air leaks.	Check suction line and component seals for suction leaks. Replace bad lines or components.
Noisy Pump	Low oil level, incorrect oil, foamy oil.	Replace, clean or add oil as needed.
	Suction line plugged, inlet screen plugged.	Clean or replace suction line and inlet screen.
	Worn or damaged pump.	Repair or replace pump.
	Cavitation.	Excessive air in the hydraulic oil from poor connections, inadequate inlet port size, and/or excessive operating speeds. Make necessary corrections.
Leaky pump or motor	Damaged/worn shaft seal.	Replace shaft seal. Correct any misalignment
	Loose or damaged parts.	Tighten or replace loose or broken parts.
Load moves with control valve in neutral.	Control valve not centering when released.	Check control valve linkage, and/or spool binding. Repair or replace as necessary.
	Improper control valve used.	Replace control valve with a "tandem center" control valve. DO NOT use a standard motor valve. NOTE: A tandem center valve is commonly used on double-acting hydraulic cylinders.
Control valve is "sticky" (it binds).	Misaligned valve linkage.	Check for misaligned valve linkage and correct.
	Tie-bolts too tight.	Adjust tie-bolts to correct torque.
	Valve damaged	Repair or replace damaged valve.
	Valve mounting plate not flat.	Flatten valve mounting surface.
Leaky Control Valve	Tie-bolts (stack valves) too loose.	Adjust tie-bolts to correct torque.
	Seals damaged or worn	Check for worn seals and replace if necessary.

Compliance

Series G2 winches comply with the following standards:

SAE J706

MIL-STD-1184 (Severe-Duty models only)

Series G2 winches conform to the following directives through compliance with the subsequent standards:

2011/65/EU - EN63000:2018

2014/30/EU - EN 50498:2010, ISO 7637-2:2011, CISPR 25

2006/42/EC - EN ISO 12100:2010, EN 60529:1992+A2:2013, EN 14492-1:2006*

* Conforms with exceptions

Requirements to make your Series G2 winch fully compliant with EN 14492-1:

Capacity Limiter

- The capacity limiter shall be set at or below the rated capacity of the winch
- SeriesG2 Electric Winches: Warn offers an OLI capacity limiter – Refer to your Replacement Parts List
- SeriesG2 Hydraulic Winches – a pressure relief valve must be installed

Emergency Stop Button

- SeriesG2 Electric Winches – an emergency stop button must be installed
- SeriesG2 Hydraulic Winches – an emergency stop valve must be installed

Rope and Drum Specifications:

- The working coefficient for the first rope layer on the drum shall be at least 2:1 (wire)
- The working coefficient for the first rope layer on the drum shall be at least 7:1 (synthetic)
- The D/d ratio to the center of the rope shall be at least 10:1
- A distance equal to 1.5x the diameter of the rope, measured from the outside edge of the drum flange to the surface of the higher rope layer, must be free (freeboard)
- There shall be at least five rope windings remaining on the drum to maintain compliance

SeriesG2 winches with wire rope must be equipped with the following to comply with EN Ratings

- SeriesG2 9 DC/HYD – Minimum Rope MBS: 80 kN (18,000 lbs) ; Maximum Rope Diameter: 11.1 mm (7/16")
- SeriesG2 12 DC/HYD – Minimum Rope MBS: 107 kN (24,000 lbs) ; Maximum Rope Diameter: 11.1 mm (7/16")
- SeriesG2 15 DC/HYD – Minimum Rope MBS: 133 kN (30,000 lbs) ; Maximum Rope Diameter: 11.1 mm (7/16")
- SeriesG2 18 DC/HYD – Minimum Rope MBS: 160 kN (36,000 lbs) ; Maximum Rope Diameter: 11.1 mm (7/16")

It is the responsibility of the WARN Authorized Service Center and/or the end user to ensure the requirements for compliance to European Harmonized Standard EN14492-1, as referenced in the European Machinery Directive, are fully met.