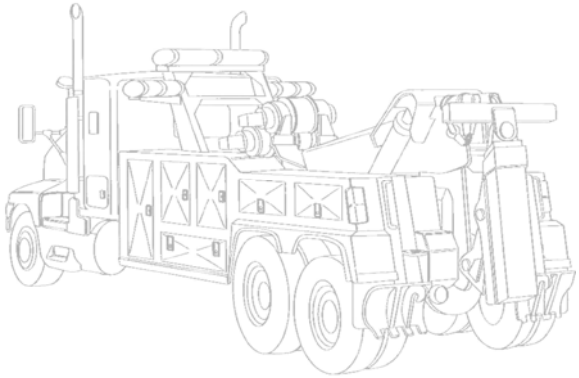
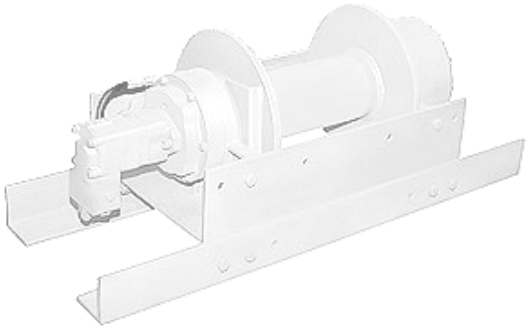
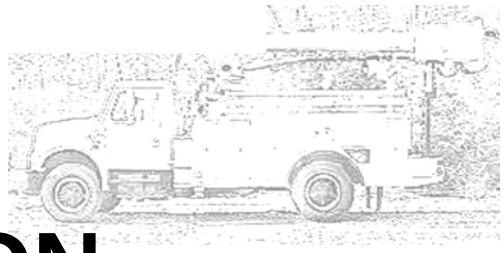
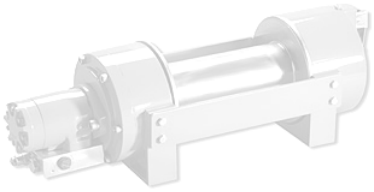
*"World class provider of planetary winches"*







# WINCH APPLICATION MANUAL



**WARNING**

To prevent serious injury or death, do not install or operate this winch before reading this manual. Keep this manual with the winch at all times. Winch operators must read and understand contents fully.

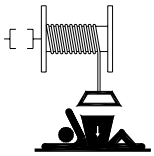
Because of continued product improvement, we reserve the right to make changes without notice. Go to www.dpwinch.com for the latest issue of this manual.

07/2006
Rev - 1

***dp*** Manufacturing, Inc.
Tulsa, OK.
1-800-***dp***-WINCH
FAX: (918) 250-0690
www.dpwinch.com

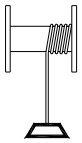
# GENERAL WARNING SHEET

*Review entire manual before installation or operation of winch.*



**DANGER**

Do not disengage gear box while winch is under load. Immediate loss of load control will result.



**DANGER**

The last five wraps of wire rope must be left on the drum to assist the wire rope clamp in holding the load.

**DANGER**

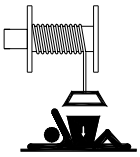
Winches are not to be used for the lifting or moving of persons.

**WARNING**

Wire rope can break without warning. Always keep a safe distance from the winch and wire rope while under a load. Consult the wire rope manufacturer for wire rope ratings and maintenance procedures.

**WARNING**

Failure to adequately align, support, or attach winch to a suitable mounting base could result in a loss of efficiency or premature failure of winch, wire rope, or mounting base.



**WARNING**

**2-Speed Motor**

Shifting into high speed with a suspended load could result in loss of speed control of the load. Drifting of the load during precise load positioning could also occur. Loss of speed control or drifting of the load could result in damage, injury or death.

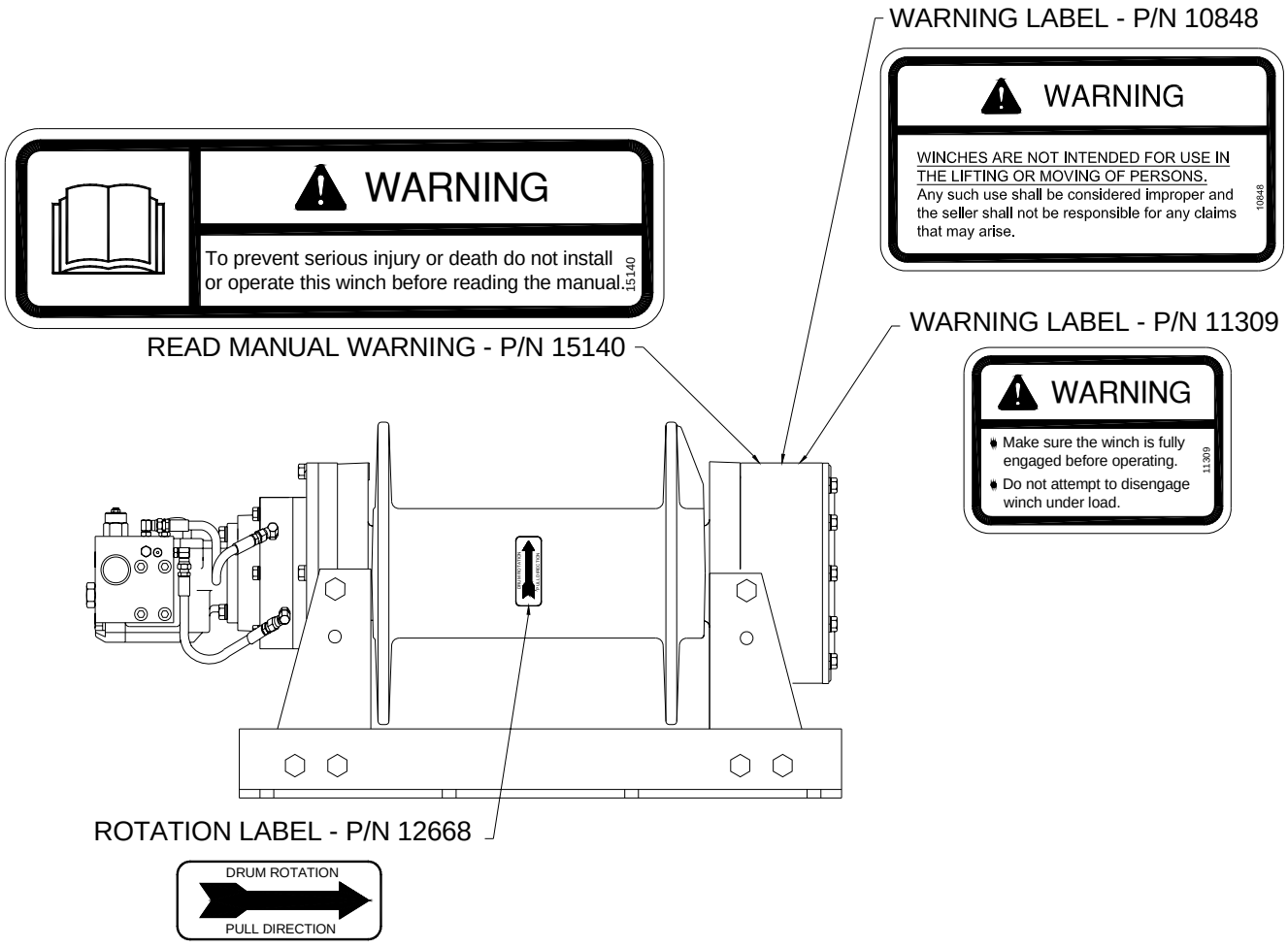
# **IMPORTANT!** SAFE OPERATING PRACTICES

dp Manufacturing, Inc. sells its product to original equipment manufacturers, distributors, and individuals who may sell to the ultimate consumer, OEM, or another distributor, agent, or dealer. As a result dp Manufacturing, Inc. does not necessarily know the application on which the product is to be placed. For that reason, you should carefully read and understand the operating instructions of the equipment on which the product is placed before you operate it.

- Read this Application manual in its entirety before attempting to install your dp product.
- Read, understand, and follow all instructions on this machine and in the manual before operation. Become completely familiar with the controls and proper use of this machine before operating it.
- Keep this manual in a safe place for future and regular reference and for ordering replacement parts.
- Keep the area of operation clear of all persons. Inadvertent shifting of a load or wire rope failure can cause serious personal injury or death.
- Do not shift the winch while it is under load. This could cause the winch to fail, resulting in damage, injury or death.
- Do not shift the winch in a sudden manner. This could cause the winch to fail, resulting in damage, injury or death.
- Always wear safety glasses or goggles and gloves during operation or while performing any adjustments or repairs.
- Do not put hands or feet near rotating parts or moving wire rope. Wire rope under tension can cause serious personal injury. Before operators power a winch, they are required to check that the area around the winch and the load being hauled is clear.
- Do not operate equipment while under the influence of alcohol or drugs.
- Do not operate the winch if the vehicle is on unstable ground or near a pit.
- Only use accessories approved for this machine by the manufacturer. Read, understand, and follow all instructions provided with the approved accessory.
- If the equipment should respond, sound, or vibrate abnormally, stop the equipment and check immediately for the cause. Unusual sounds or vibrations are generally a warning of trouble.
- If a situation occurs that may cause damage to your winch or gear box (such as impact loading, disengaging while under load, engaging the gears while they are still turning or overloading the winch) the winch or gear box should be disassembled, inspected for damage and repaired before returning to service.
- When replacement parts are required, only use parts provided by dp Manufacturing, Inc. or authorized by dp Manufacturing, Inc.
- Upon completion of any service or repairs, operate this equipment prior to use to determine that the equipment is in proper operation condition.
- If situations occur which are not covered in this manual, use care and good judgment.
- Do not use dp Manufacturing, Inc. winches for abnormal use. They should only be used in the specified manner.
- The designer/installer should refer to International Standards EN 292-2 (Safety of Machinery – Basic Concepts, General Principles for Design) and EN 237.98, Annex 1 (Essential Health and Safety Requirements Relative to the Design and Construction of Machinery and Safety Components) when installing the winch and associated equipment. This is an essential health and safety requirement of the European Community.
- Never run a dp winch unattended. Always pay close attention to the winch while it is running.
- Never attempt to pull more than the winch is rated for.

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

# WARNING LABEL LOCATIONS



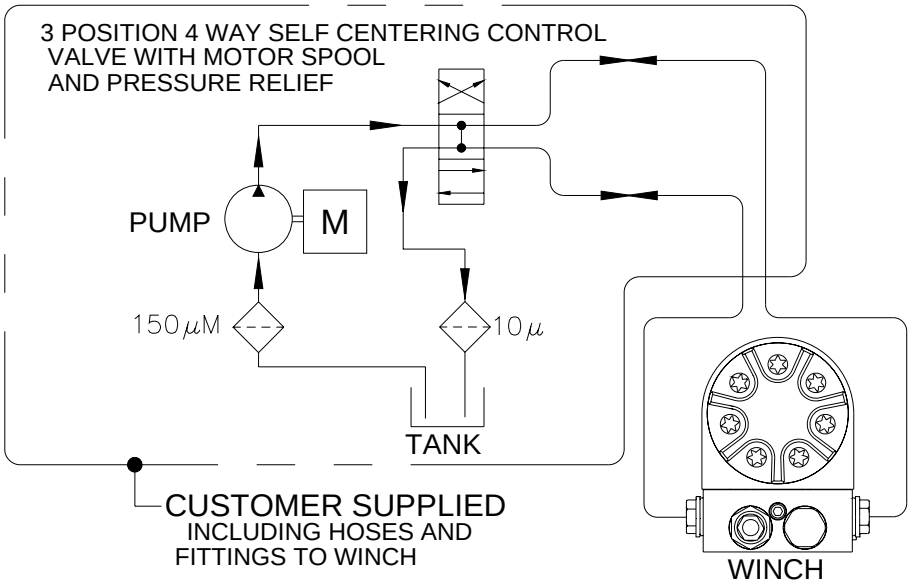

Warning label locations may vary according to winch model.

Note: The removal or defacement of warning labels affixed to winches becomes the sole responsibility of the purchaser and will constitute a waver of claims to *dp* Manufacturing, Inc.

# HYDRAULIC SYSTEM

## WARNING

The hydraulic system shown below must contain an open center, or motor spool, valve in order for the winch to operate correctly. Failure to use the correct control will result in loss of load control, possibly resulting in damage to property, personal injury or death.




**TYPICAL HYDRAULIC SYSTEM**

## WARNING

The relief must be set so the pressure supplied to the winch does not exceed the pressure rating of the winch. If the pressure or flow exceeds those rated for the winch, it could cause the winch, winch mounting or wire rope to fail. This could result in damage to property, personal injury or death.

## CAUTION

Hydraulic pressures or flows lower than those rated for the winch will result in a lower line pull or lower line speed.

## CAUTION

Control devices should be positioned for safe operation of the winch without hesitation or loss of time. They should also be designed so the operator or other persons are not exposed to any danger zones.

# WINCH MOUNTING

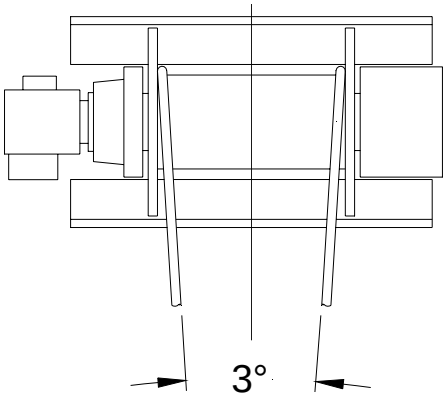
Knowledgeable parties should install all ***dp*** winches. Consult ***dp*** Manufacturing if questions should arise. When users or third parties modify the winch or the vehicle that a winch is mounted to, they become responsible for the modifications and any results caused by the modifications. The finished installation should be able to withstand the maximum load applied to the vehicle by the full rated load of the winch.

Vehicles that ***dp*** winches are mounted on must have sufficient structural capacity to support the combined load that can be produced by all of the winches on the vehicle.

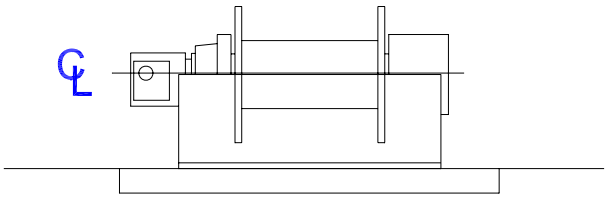
1. The winch should be mounted as close to center and as perpendicular as possible to the direction of the line pull. This will keep the wire rope fleet angle centered on the drum as small as possible. The maximum recommended fleet angle for smooth wire rope reeving is 3° total.

**WARNING**

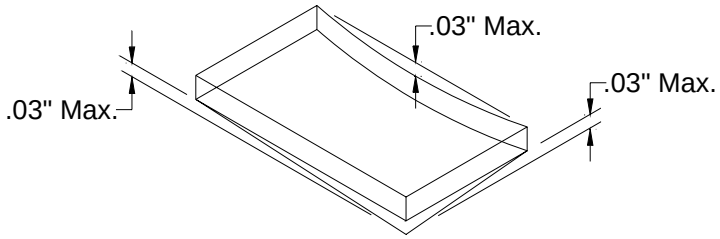
If the proper fleet angle is not maintained, the wire rope could wind onto one side of the drum. This could cause failure of the winch or wire rope, resulting in damage, injury or death.




2. The winch drum centerline should be mounted on a horizontal plane to insure proper lubrication to both ends of the winch.

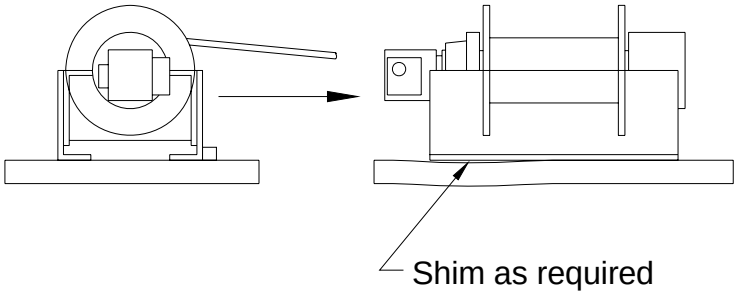


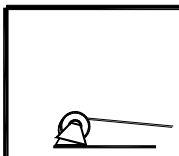

3. The winch mounting surface must be flat within .03" from any location and rigid enough to withstand full rated line pull without distortion of more than .03" in any direction.



# WINCH MOUNTING (Continued)

4. Attach the winch to the mounting base. Shim stock may be used between the mounting surface and winch to insure the winch base is flat and fully supported. The winch shall be adequately attached to mounting base to support the full rated load without any movement between the winch and base.



**WARNING**

Failure to adequately align, support, or attach winch to a suitable mounting base could result in a loss of efficiency or premature failure of winch.

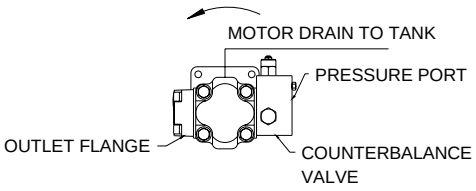
# WINCH INSTALLATION

## To Reverse Direction of Drum Rotation

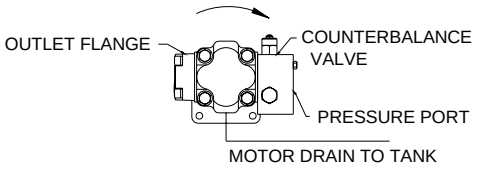
COMMERCIAL INTERTECH - METHOD 1

REMOVE THE COUNTERBALANCE VALVE AND OUTLET FLANGE.
REMOVE THE MOTOR MOUNTING BOLTS AND ROTATE THE MOTOR 180°.
REASSEMBLE MOTOR, COUNTERBALANCE VALVE, AND OUTLET FLANGE.

(STD) L



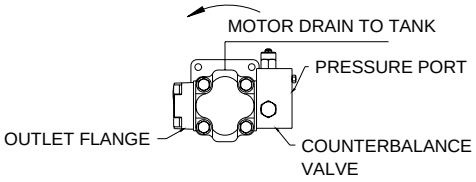

R



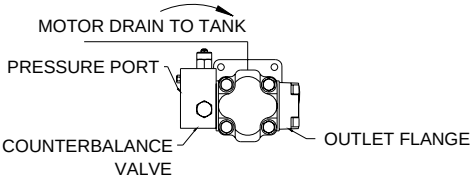

COMMERCIAL INTERTECH - METHOD 2

SWITCH POSITIONS OF COUNTERBALANCE VALVE AND OUTLET FLANGE.
NOTE: HOSES GOING TO BRAKE HOUSING MAY NEED TO BE LENGTHENED.

(STD) L




R



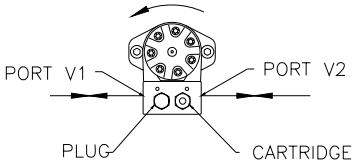

---

(STD) L

L PRESSURE TO V1 ROTATES WINCH DRUM COUNTER CLOCKWISE WHEN VIEWED FROM MOTOR END.

R PRESSURE TO V2 ROTATES WINCH DRUM CLOCKWISE WHEN VIEWED FROM MOTOR END.

TO REVERSE WIRE ROPE PULL DIRECTION,
SWITCH POSITIONS OF CARTRIDGE AND PLUG.

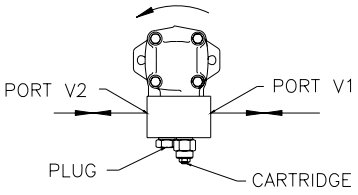



(STD) L

L PRESSURE TO V1 ROTATES WINCH DRUM COUNTER CLOCKWISE WHEN VIEWED FROM MOTOR END.

R PRESSURE TO V2 ROTATES WINCH DRUM CLOCKWISE WHEN VIEWED FROM MOTOR END.

TO REVERSE WIRE ROPE PULL DIRECTION,
SWITCH POSITIONS OF CARTRIDGE AND PLUG.




---

ALL UTILITY UNITS ARE BI-DIRECTIONAL WITHOUT MANIPULATION OF CARTRIDGE, AND OR PLUG LOCATIONS.

---

NOTE: IF TENSIONER AND, OR FAIRLEAD OPTIONS EXIST, THEN REVERSAL OF THEIR POSITION IN RELATION TO WINCH MUST TAKE PLACE BEFORE REVERSAL OF WIRE ROPE PULL DIRECTION CAN OCCUR.

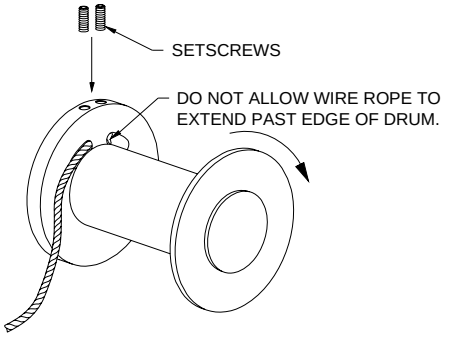
---

**WARNING**

Do not adjust any cartridge on the winch unless directed to do so by *dp* Manufacturing. They are preset at the desired pressure and may effect the performance of the winch if adjusted incorrectly.

# WINCH INSTALLATION (Continued)

## Wire Rope Installation

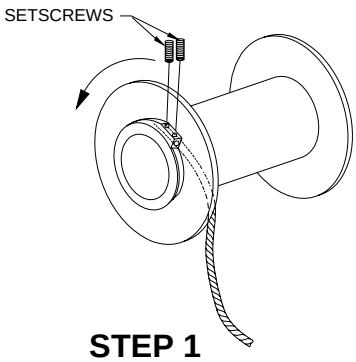



### STEP 1

**INSERT WIRE ROPE INTO PROPER SLOT ACCORDING TO DRUM ROTATION AND THREAD SET-SCREWS INTO THREADED HOLES IN DRUM FLANGE, MAKING SURE THAT BOTH SCREWS CLAMP ONTO WIRE ROPE.**

### STEP 2

**ONCE SET-SCREWS ARE TIGHTENED SECURE, THE WIRE ROPE IS PROPERLY INSTALLED.**




### STEP 1

**INSERT WIRE ROPE INTO SLOT ACCORDING TO DRUM ROTATION.**

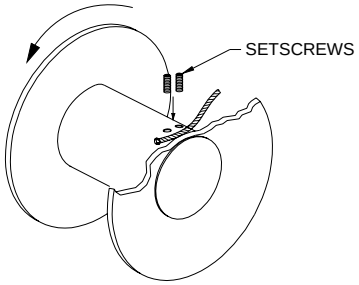
### STEP 2

**WRAP WIRE ROPE AROUND OUTSIDE OF FLANGE AND INSERT THROUGH CABLE ANCHOR.**

**THREAD SET-SCREWS INTO THREADED HOLES IN ANCHOR, MAKING SURE THAT BOTH SCREWS CLAMP ONTO WIRE ROPE.**

### STEP 3

**ONCE SET-SCREWS ARE TIGHTENED SECURE, THE WIRE ROPE IS PROPERLY INSTALLED.**

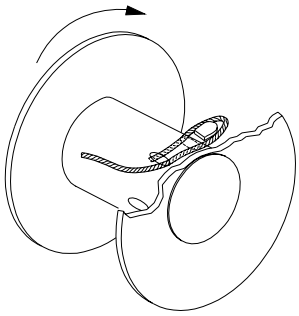



### STEP 1

**INSERT WIRE ROPE INTO PROPER SLOT ACCORDING TO DRUM ROTATION AND THREAD SET-SCREWS INTO THREADED HOLES IN DRUM FLANGE, MAKING SURE THAT BOTH SCREWS CLAMP ONTO WIRE ROPE.**

### STEP 2

**ONCE SET-SCREWS ARE TIGHTENED SECURE, THE WIRE ROPE IS PROPERLY INSTALLED.**



### STEP 1

**INSERT WIRE ROPE INTO POCKET OPENING AND THROUGH WEDGE POCKET.**

### STEP 2

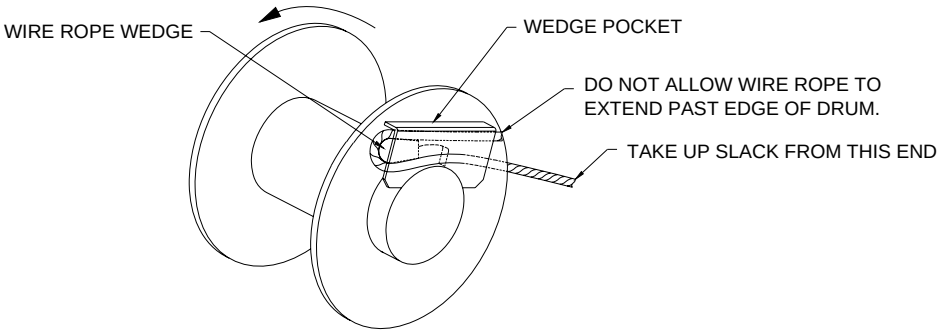
**LOOP WIRE ROPE END AROUND WEDGE AND FEED WIRE ROPE BACK THROUGH WEDGE POCKET.**

### STEP 3

**ONCE SLACK IS TAKEN UP, THE WIRE ROPE IS PROPERLY INSTALLED.**

# WINCH INSTALLATION (Continued)

## Wire Rope Installation




### STEP 1

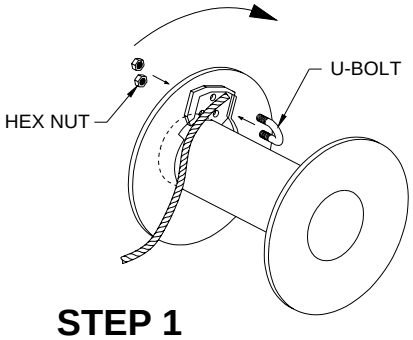
**INSERT WIRE ROPE INTO POCKET OPENING AND THROUGH WEDGE POCKET.**

### STEP 2

**LOOP WIRE ROPE END AROUND WEDGE AND FEED WIRE ROPE BACK THROUGH WEDGE POCKET.**

### STEP 3

**ONCE SLACK IS TAKEN UP, THE WIRE ROPE IS PROPERLY INSTALLED.**




### STEP 1

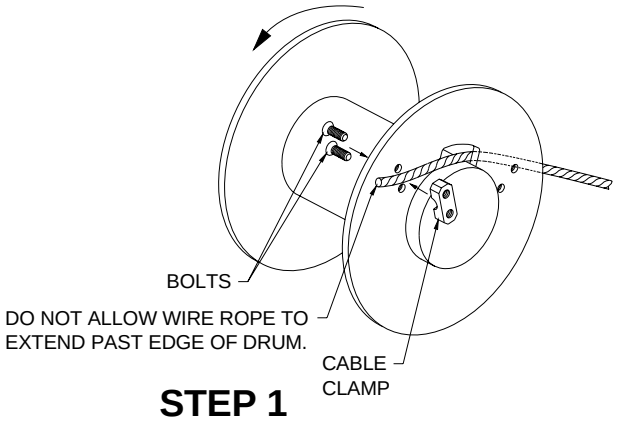
**ALIGN WIRE ROPE BETWEEN PROPER HOLES ACCORDING TO DRUM ROTATION. INSERT U-BOLT INTO HOLES AND THEAD ON NUTS FROM BACK OF FLANGE.**

### STEP 2

**ONCE NUTS ARE TIGHTENED SECURE, THE WIRE ROPE IS PROPERLY INSTALLED.**

# WINCH INSTALLATION (Continued)

Wire Rope Installation




## STEP 1

**INSERT WIRE ROPE INTO FLANGE OPENING.**

## STEP 2

**PULL WIRE ROPE THROUGH AND ALIGN BETWEEN FLANGE HOLES. POSITION CLAMP OVER WIRE ROPE, AND THREAD BOLTS AS SHOWN.**

## STEP 3

**ONCE BOLTS ARE TIGHTENED SECURE, THE WIRE ROPE IS PROPERLY INSTALLED.**

## ⚠ DANGER

If the wire rope is not installed for the correct drum rotation, the winch brake valve will not hold the load.
Do not apply full load to the winch with less than 5 full wire rope wraps on the drum.
The last five wraps of wire rope must be left on the drum to assist the wire rope clamp in holding the load.
Wire rope can break without warning. Always keep a safe distance from the winch and wire rope while under a load.
Never pull the winch with wire rope that is damaged in any way.
Consult the wire rope manufacturer for wire rope ratings and maintenance procedures.

# WINCHING PRINCIPLES

A basic knowledge of hydraulics and equipment application is needed in winching, both as a matter of safety, and for the best operational results. dp Manufacturing winches should only be run by experienced operators. This relates specifically to three factors for which a vehicles resistance to motion is contingent:

A) **Total Weight** - A vehicles total weight.
B) **Surface Drag** - The characteristics of the terrain, or surface to be traversed.
C) **Gradient Resistance** - The incline of grade, or slope on which the vehicle is being moved.

A) **Total Weight (Wt)** should include all attributing factors, including fuel, passengers, cargo, and equipment.

B) **Surface Drag (S)** is the single most significant factor in winching. Assuming the vehicle is in proper working condition, a flat surface will use approximately 4% of its total weight to initiate motion. In opposition, a restrictive surface can require as much as 50% of the vehicles total weight.

Refer to the following table for proportionate effects:

| Surface Type | Surface Drag (S) |
|---|---|
| Hard flat road | .04 |
| Grass | .14 |
| Sand (hard wet) | .17 |
| Gravel | .20 |
| Sand (soft wet) | .20 |
| Sand (soft/dry/loose) | .25 |
| Shallow mud | .33 |
| Bog | .50 |
| Marsh | .50 |
| Clay (clinging) | .50 |

The values and calculations in this section are approximate and are for reference only.

Basic mathematics will indicate the approximate rolling resistance of a vehicle that is functioning properly.

Example: If the surface is gravel, .20 is multiplied by the vehicles total weight. If the total weight is 5,000 pounds, then the approximate rolling resistance is 1,000 pounds.

(5,000 pounds x .2 = 1,000 pounds)

*Note: This equation is only applicable for flat surfaces. For all other surfaces, the calculation must include the gradient resistance co-efficient.*

C) **Gradient Resistance (G)** For practical purposes, gradient resistance can be taken as 1/60th of the weight of the vehicle for each degree of the slope. Slope is defined as height versus the horizontal distance. See Figure 1.

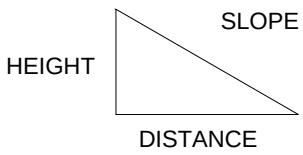
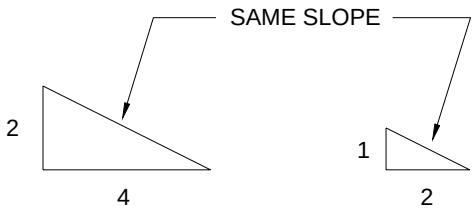



Figure 1

# WINCHING PRINCIPLES (Continued)

The height and distance can be defined in terms of a ratio.




For example, if the height is 1 and the distance is 2, the slope will be the same as if the height was 2 and the distance was 4, and so on (see above). The following table can be used to find the gradient values for the given ratio of height and distance.

**GRADIENT VALUES**

| Ratio | | Angle (ref.) | Gradient (G) |
|---|---|---|---|
| Height | Distance | | |
| 1 | 1 | 45° | .75 |
| 1 | 2 | 27° | .44 |
| 1 | 3 | 18° | .31 |
| 1 | 4 | 14° | .23 |
| 1 | 5 | 11° | .19 |
| 1 | 6 | 9° | .16 |
| 1 | 7 | 8° | .14 |
| 1 | 8 | 7° | .12 |
| 1 | 10 | 6° | .10 |
| 1 | 12 | 5° | .08 |
| 1 | 15 | 4° | .06 |
| 1 | 20 | 3° | .04 |
| 1 | 30 | 2° | .03 |
| 1 | 50 | 1° | .02 |

Combining the weight of the vehicle (Wt), the type of the surface to be traversed (S), and the gradient to overcome (G), use the following formula.

(Weight of vehicle x Surface drag) + (Gradient value x Weight of vehicle) = Effort required.

Or, (Wt x S) + (G x Wt) = Effort required.

For example, if a vehicle weighing 4,500 pounds were winched up an inclined dune that is 20 long and 10 tall of dry, loose, sand, then the above formula would be used as follows:

Where, Wt = 4,500 pounds (vehicle weight)
S = .25 (co-efficient for soft sand)
G = .44 (gradient value)

We have, (4,500 lbs. x .25) + (.44 x 4,500 lbs.) =

1,125 lbs. + 1,980 lbs. = 3,105 pound of effort required to recover the vehicle.

# WINCHING PRINCIPLES (Continued)

## USE OF SNATCH BLOCKS

An important aid to successful winching is the snatch block, which can be used to increase the pulling power of a winch or change the direction of a pull. The following figures show typical examples of how a snatch block can be used to gain an advantage.

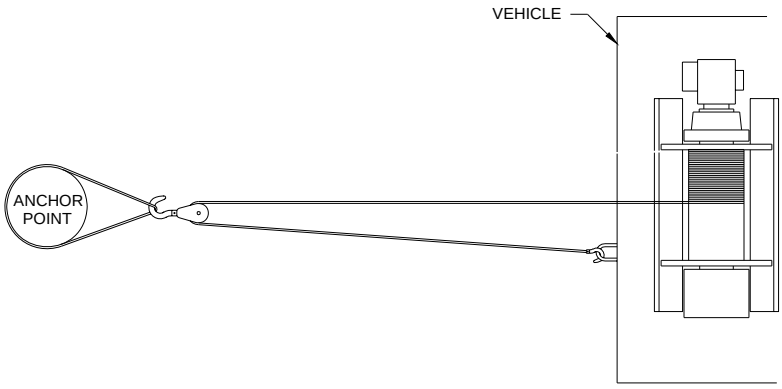



Figure 1

Figure 1 shows self recovery using a snatch block attached to an anchor point. In this instance the vehicle becomes the load. The pull applied to the vehicle is twice as much as the line pull of the winch.

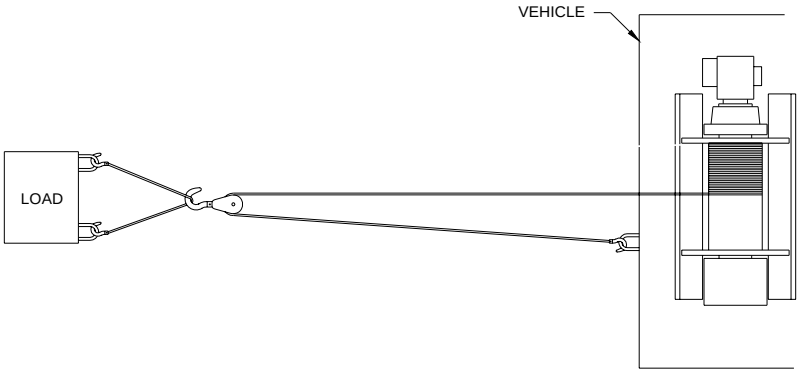



Figure 2

Figure 2 shows a direct pull on a load using the vehicle as the anchor with the snatch block attached to the load. The pull on the load will be twice as much as the line pull of the winch. The end of the wire rope may be anchored indirectly instead of using the vehicle but it is not recommended. If the end of the wire rope is anchored indirectly, the recovery should be in stages by moving the anchor point or vehicle to avoid paying the winch in at sharp angles.

**WARNING**

Always make sure that the wire rope is securely fastened to the load. Consult the Wire Rope Users Manual published by the Wire Rope Technical Board or the wire rope manufacturer for the proper wire rope attachment method for your application.

# WINCHING PRINCIPLES (Continued)

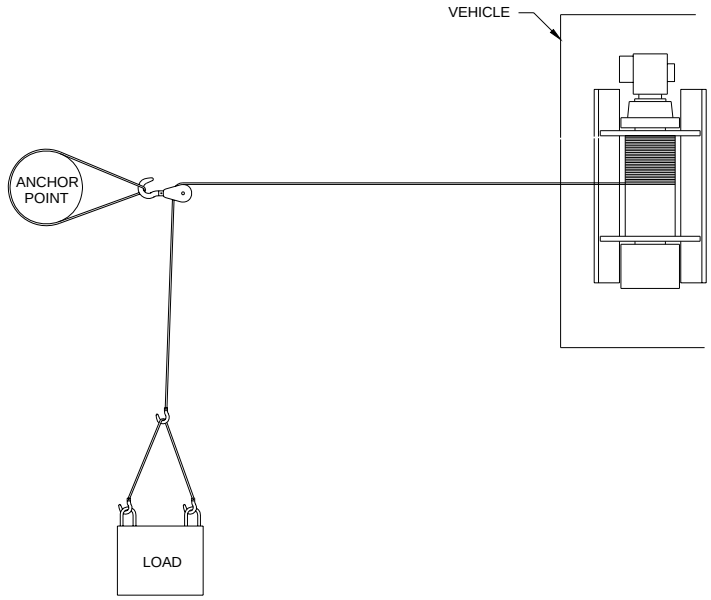



Figure 3

Figure 3 shows an indirect pull where the vehicle is limited due to unsuitable ground or obstruction, using a snatch block attached to a suitable anchor point. The pull on the load is the actual line pull of the winch.

*Notes:*
*1) If more than one snatch block is used, they must be located at least 36" apart. If they are any closer than that, the wire rope can not properly realign itself and the chance of failure increases.*
*2) The effort required may be outside the capacity of the winch - (the rating system of a winch usually refers to the first layer of wire rope on the drum) In this case, one solution may be to run out the greatest majority of wire rope in order to increase the efficiency of the rated capacity, or install a snatch block pulley in the winch line to create a mechanical leverage, thus practically cutting the effort required in half.*

**WARNING**

If the winch is used in an application other than self recovery:
- Do not attempt to pull a load if the vehicle that the winch is mounted on is parked on unstable ground.
- The vehicle that the winch is mounted on must stay stationary when the winch is being operated.

**WARNING**

If a sheave is used to guide the wire rope, consult the wire rope manufacturer or the Wire Rope Users Guide published by the Wire Rope Technical Board for the proper sheave specifications needed for the application. Do not use the boom or vehicle to move a load while the winch's wire rope is attached to load.

# ACCESSORIES

## Cable Hold Down

The purpose of ***dp*** Manufacturing cable hold down devices is to keep the wire rope tight on the drum while the winch is in freespool mode or while there is no load on the wire rope. ***dp*** Manufacturing cable hold down devices should NOT be relied upon to insure that the wire rope winds onto the winch evenly.

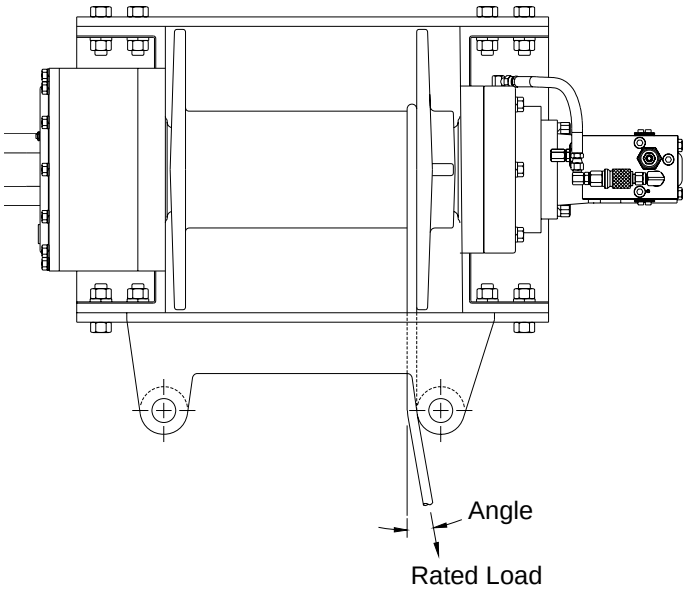
For ***dp*** Manufacturing cable hold down devices that are operated using pneumatic air springs, the air pressure supplied to the air springs should be reduced when the wire rope is being payed-out using the hydraulic power of the winch. If the air supply to the air springs is not reduced when the wire rope is being payed-out using the hydraulic power of the winch, the cable could become loose on the drum and possibly damage the winch or wire rope.

**⚠ WARNING**

If the wire rope is allowed to wind onto the drum in an uneven or disorderly manner, damage to the the tensioner may occur. This could cause damage or failure of the winch or wire rope resulting in damage, injury or death.

## Fairleads

The use of a fairlead does not insure that the wire rope will wind onto the drum in an orderly manner. The proper fleet angle must be maintained for the wire rope to wind onto the drum in an orderly manner (see "Winch Mounting" for the proper fleet angle).




Note: This figure is for illustration purposes only. The configuration of the fairlead may vary according to the model of the winch.

**⚠ WARNING**

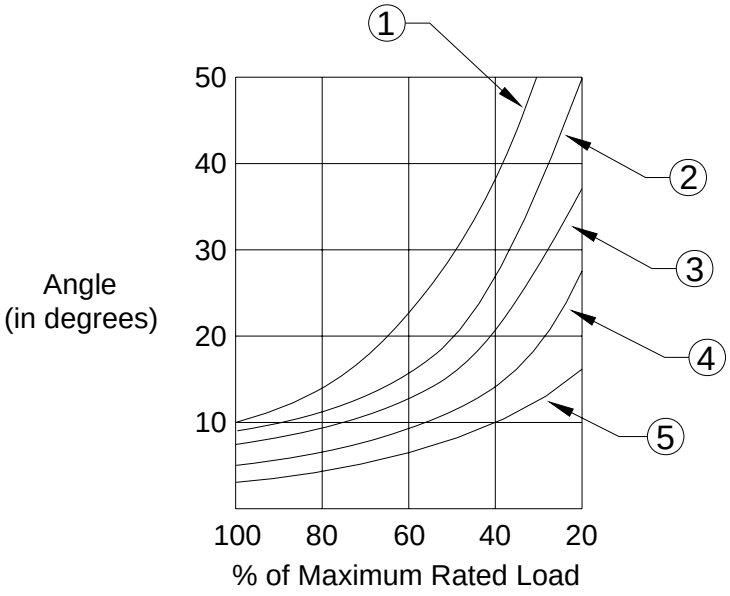
If the proper fleet angle is not maintained, the wire rope could wind onto one side of the drum. This could cause failure of the winch or wire rope, resulting in damage, injury or death.

**⚠ WARNING**

Due to the diameter of the fairlead rollers, contact with the wire rope must be limited. Excessive contact of the wire rope with the fairlead rollers could lead to failure of the wire rope resulting in damage, injury or death.

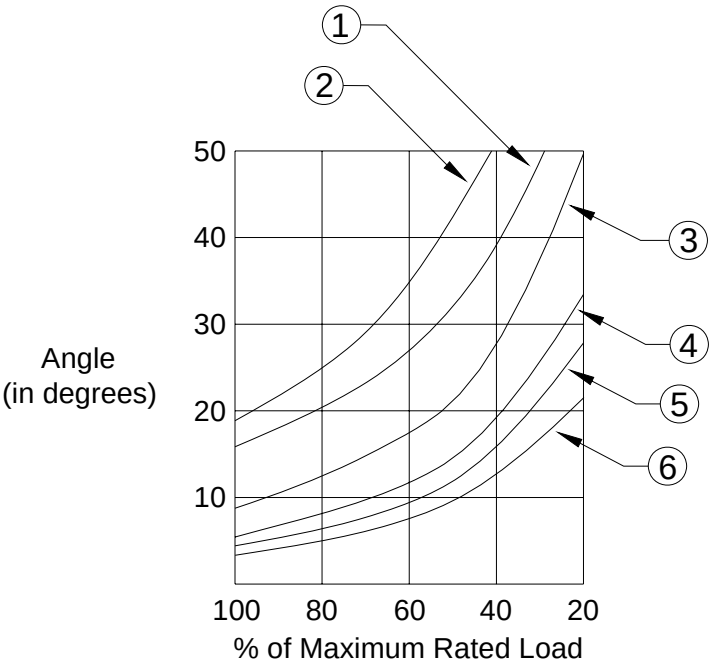
# ACCESSORIES Continued

The following graphs can be used to determine the angle at which the percentage of the rated load on the first layer may be pulled against the fairlead rollers (see illustration on previous page).




| Curve # | Winch Model |
|---|---|
| 1 | 12, 15, 45, 50 |
| 2 | 8GR, 10GR, 10J, 12J, 12AJ |
| 3 | 15AJ, 25, 30 |
| 4 | 20AJ, 20 |
| 5 | 16J, 35 |

## Horizontal Roller




| Curve # | Winch Model |
|---|---|
| 1 | 8GR, 10GR, 10J, 15 |
| 2 | 12J, 12, 45, 50 |
| 3 | 16J, 12AJ, 20, 25 |
| 4 | 15AJ, 30 |
| 5 | 20AJ |
| 6 | 35 |

## Vertical Roller

**CAUTION**

If the proper angle between the load and the fairlead is not maintained, it could result in damage to the winch.

# TROUBLE SHOOTING

| Condition | Possible Cause | Correction |
|---|---|---|
| WINCH WILL NOT PAY OUT. | The brake is not releasing because it is not getting the pilot signal. | Check the pressure at the S1 port of the brake valve. With the hydraulic system running, the pressure at the S1 port will be approximately equal to the system pressure. The brake is fully opened at 270 psi. If the pressure at S1 is not correct, replace the brake valve. |
| | The brake is mechanically binding up. | If the pressure at S1 reads 270 psi and the brake does not release, the brake may be mechanically bound. This requires disassembly of the motor end to correct the problem. Contact dp Parts and Service Department before disassembly. |
| | The hydraulic system will not build up enough pressure to release the brake. | The relief valve, located in the system control valve, is set too low or stuck open.<br>OR, the hydraulic pump has failed. |
| | The gear train is mechanically binding up. | This will require disassembly of the winch for repair. Contact dp Parts and Service department before disassembly. |
| WINCH WILL NOT PULL LOAD. | The brake is not releasing. | Check the pressure at the S1 port of the brake valve. With the hydraulic system running, the pressure at the S1 port will be approximately equal to the system pressure. The brake is fully opened at 270 psi. If the pressure at S1 is not correct, replace the brake valve.<br>If the pressure at S1 reads 270 psi and the brake does not release, the brake may be mechanically bound. This requires disassembly of the motor end to correct the problem. Contact dp Parts and Service Department before disassembly. |
| | The hydraulic system pressure is not adequate to power the load, or the back pressure is too high. | Check the pressure by installing pressure gauges on each side of the winch motor. Compare the difference shown on the gauges with the winch performance information. |
| | Winch is mechanically binding up. | Check to insure that the winch is mounted on a flat, rigid surface.<br>Loosen, but do not remove, the capscrews that are attaching the support straps (or base angles if you have a low mount winch) to the end supports. Rotate the drum, making sure that it turns freely without sticking. Tighten the capscrews.<br>Remove and disassemble the winch for repair and mounting adjustment. Contact dp Parts and Service before disassembling. |
| HYDRAULIC OIL IS LEAKING FROM THE BRAKE HOUSING, MOTOR OR END SUPPORT. | Front seal in the hydraulic motor shaft has failed. | Remove and replace the motor.<br>Replace or repair the brake. Contact dp Parts and Service.<br>Drain oil and refill. Check end support to insure that there is not additional leakage. |

## *GENERAL INFORMATION*

**MISCELLANEOUS LUBRICATION POINTS**

***dp*** fairlead rollers require lubrication by a medium heavy oil on a weekly basis. Fairlead rollers are supplied with oil impregnated bronze bearing and require a few drops of medium heavy oil at each bearing location.

Manual kick out levers should be cleaned and lubricated with a coat of light oil on the shaft and detent mechanism (avoid excessive oil build up, which will attract dust).

**PNEUMATIC SYSTEM**

Some dp products use air pressure to power the drum disengagement. These components require dry air for trouble free service. A typical pneumatic system should have an FDL (filter, dryer, lubricator) and a pressure regulator. More than (1) pressure regulator may be required, depending on the pressure requirements of the different components. It is important to keep moisture from entering the winch. Moisture could cause corrosion. If temperatures fall below 32°F, moisture could freeze and render the component inoperable. *See the performance page for the proper pressure requirements.*

**EXTENDED STORAGE PROCEDURES**

If you plan to store your ***dp*** product for more than 90 days some extra precautions are required to insure your product will be ready to perform when put back into service.

- Wash and dry the exterior of the winch.
- Service the wire rope as recommended by the wire rope manufacturer.
- The winch should be filled with the appropriate corrosion-inhibiting lubricant and operated for 5 minutes in both directions to distribute the lubricant. The winch should then be filled to the highest possible level, I.E. vent high (this will insure the maximum coverage of internal components). *Note: drain oil to normal operation level before returning to service.*
- The internal components of the pneumatic system should be coated with a corrosion-inhibiting lubricant. If a pneumatic lubrication system is not installed, this can be accomplished by spraying an aerosol lubricant into the ports of the components and shifting several times to distribute the lubricant evenly.
- All ports should be plugged (i.e. motor inlet/outlet ports, drum disengagement)
- Lubricate all external components
    - Fairlead rollers
    - Pivot points of cable hold down
    - Manual drum disengagement handle

## *HYDRAULIC SYSTEM*

**FLUID SPECIFICATIONS**

When choosing a fluid, it is important to consider the start-up and operating temperatures. Generally, when the winch is initially started, the fluid is thick and with the movement of internal parts, the fluid warms up and thins out. Premium grade petroleum based hydraulic fluids containing anti-wear, anti-foaming and oxidation inhibitors will provide the best performance. ***dp*** Manufacturing recommends an oil viscosity of 20-43 cSt. The oil viscosity should never be allowed to fall below 13 cSt. Oil viscosity above 43 cSt is detrimental to the 2 speed and variable displacement motors. If the temperature is below 32°F, the winch needs to be warmed up before it is pulled at full load. Do not pull the winch if the temperature is below -50°F or above 180°F. Consult your local hydraulic fluid distributor for assistance in selecting a fluid that will best suit your climate and application.

**FLUID / SYSTEM MAINTENANCE**

Maintaining correct fluid viscosity and cleanliness level is essential for all hydraulic systems. ***dp*** products are used in a wide variety of applications and it is impossible to publish a fluid maintenance schedule that would cover every situation. ***dp*** recommends that the minimum hydraulic fluid cleanliness be maintained at an ISO Cleanliness Code 18/13 rating. *Your hydraulic system designer can recommend an adequate filtration system and maintenance schedule to achieve this rating.*

# *WINCH LUBRICATION*

**LUBRICANT SPECIFICATIONS**

Gear lubrication is an important component in insuring the long life of your winch. The type of lubricant will have a great influence. Generally a gear lubricant should have a viscosity of 100 to 250 cSt at the expected ambient operating temperature. For operation in lower temperature ranges, it is imperative that the pour point of the lubricant be at least 10° below the lowest ambient temperature. The oil you select should meet GL5 performance standards for high pressure, possess rust/oxidation inhibitors, and low foaming properties. Many lubricants available under a variety of trade names meet these requirements. Unless otherwise requested, the gear oil your winch was shipped with is *GL5 80W90*. C*onsult your local lubricant distributor on the selection that best fits your climate and application.*

GENERAL LUBRICANTS

*For Reference Only*

| Temperature (°F) | Type of oil | Viscosity (cSt) At 40°/100°C |
|---|---|---|
| 10° to 120° | 85W140 | 360/25 |
| -25° to 40° | 80W90 | 145/15 |
| -50° to 30° | Synthetic ISO 32 | 31/6 |

All types of lubricant listed here conform to MIL SPEC-L-2105D.

**CHANGE INTERVAL**

The initial lubricant should be changed after the first 10 hours of operation. During this “breaking in” period it is normal for the lubricant to contain minuscule black & bronze particles. Subsequent changes should be scheduled every 250 hours of operation or annually.

**LUBRICATION LEVEL**

The oil level should be checked with the winch centerline horizontal. The winch should be filled to the bottom of the fill/level plug. If your winch has more than (1) fill/level plug, select the plug that is slightly above the centerline. *If unit is mounted in a non-standard orientation, consult **dp** Service Department for lubrication level information.*

**GREASE**

If the winch comes with a fairlead that has grease fittings on the rollers, the grease used conforms to MIL-G-10924 and should be used in the temp range of -50° F to 120° F.

1. Oil Check and Fill
   a. Remove oil fill plug.
   b. Oil level should be visible. If overfull and thin it may indicate hydraulic oil leakage through the brake. Correct by draining and refilling before operating winch. If this condition continues winch should be checked for seal failure. See Trouble Shooting Information.
   c. Add specified gear lubrication oil as required to bring to proper lever.
   d. If winch lubrication oil consistently checks low, inspect unit for leaking seals or gaskets.
2. Oil Drain and Replacement
   a. Remove oil drain & fill plug.
   b. Drain oil.
   c. Clean drain plug and replace. Fill with oil to proper level.
   d. Oil should be changed after the first 10 hours of operation. Change should then be on an annual basis.
3. **CAUTION**: Winch lubrication oil is not hydraulic oil.

**Note:** dp Manufacturing, Inc. takes no responsibility for the subsequent performance of hydraulic or mechanical components if oil, grease or hydraulic fluid possessing properties other than what dp Manufacturing, Inc. recommends is used.

# DP Winch Limited Warranty

*Effective 8/1/2008*

*SUPERSEDES ALL PRIOR WARRANTIES*

Seller warrants that each article (whether Gear Drive Products, Brake Products and/or Winch Products, all of which are covered hereunder) sold under this order shall at the time of shipment (i) conform to applicable specifications, and (ii) be free from defects in material and workmanship during normal and ordinary use and service (the "Warranty").

Buyer's exclusive remedy and Seller's sole obligation under this Warranty shall be, at Seller's option, to repair or replace any article or part thereof which has proven to be defective, or to refund the purchase price of such article or part thereof. Buyer acknowledges that Buyer is knowledgeable concerning the articles covered by this Warranty and sold in connection therewith which are being purchased, that Buyer has reviewed this Warranty and that the remedies provided hereunder are adequate and acceptable to Buyer.

This Warranty shall expire one (1) year from the date the article is first shipped by Seller. Notice of claimed breach of this Warranty must be given by Buyer to Seller within the applicable period. Such notice shall include an explanation of the claimed warranty defect and proof of date of purchase of the article or part thereof for which warranty coverage is sought. No allowances shall be made by Seller for any transportation, labor charges, parts, "in and out" costs, adjustments or repairs, or any other work, unless such items are authorized in writing and in advance by Seller. Nor shall Seller have any obligation to repair or replace items which by their nature are expendable.

If an article is claimed to be defective in material or workmanship, or not to conform to the applicable specifications, Seller will either examine the article at Buyer's site or issue shipping instructions for return to Seller. This Warranty shall not extend to any articles or parts thereof which have been installed, used, or serviced otherwise than in conformity with Seller's applicable specifications, manuals, bulletins, or instructions, or which shall have been subjected to improper installation, operation, or usage, misapplication, neglect, incorrect installation, overloading, or employment for other than normal and ordinary use and service. This Warranty shall not apply to any article which has been repaired, altered or disassembled, or assembled by personnel other than those of Seller. This Warranty shall not apply to any article upon which repairs or alterations have been made (unless authorized in writing and in advance by Seller). This Warranty shall not apply to any articles or parts thereof furnished by Seller to Buyer's specifications and/or furnished by Buyer or acquired from others at Buyer's request.

SELLER MAKES NO EXPRESS WARRANTIES AND NO IMPLIED WARRANTIES OF ANY KIND, OTHER THAN THE WARRANTY EXPRESSLY SET FORTH ABOVE. SUCH WARRANTY IS EXCLUSIVE AND IS MADE AND ACCEPTED IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Buyer expressly agrees that Seller is not responsible to perform any work or investigation related in any way to torsional vibration issues and is not responsible for the detection or remedy of Natural Frequency Vibration of the mechanical system in which the unit is installed. Buyer acknowledges, understands and agrees that this Warranty does not cover failures of the unit which result in any manner from the operation of the machine or unit at vibration frequencies at or near the natural frequency vibration of the machine in such a way that damage may result. Buyer expressly agrees that Seller is not responsible for failure damage or accelerated wear caused by machine or ambient vibration. Further, Buyer acknowledges and agrees that Buyer is always solely responsible for determination and final approval of the “application factor” which may be used in Seller’s calculations, and this application factor is 1.0 unless otherwise stated in Seller’s quotation specifications.

The remedies for this Warranty shall be only those expressly set forth above, to the exclusion of any and all other remedies of whatsoever kind. The limited remedies set forth above shall be deemed exclusive, even though they may fail their essential purpose. No agreement varying or extending the foregoing Warranty, remedies, exclusions, or limitations shall be effective unless in a writing signed by an executive officer of Seller and Buyer. This Warranty is non-transferable. If a party who had purchased articles from Buyer, or from persons in privity with Buyer, brings any action or proceeding against Seller for remedies other than those set forth in this Warranty, Buyer agrees to defend Seller against the claims asserted in such action or proceeding at Buyer’s expense, including the payment of attorneys’ fees and costs, and indemnify Seller and hold Seller harmless of, from and against all such claims, actions, proceedings or judgments therein. Buyer also agrees to defend and indemnify Seller of, from and against any loss, cost, damage, claim, debt or expenses, including attorneys’ fees, resulting from any claims by Buyer or third parties to property or injury to persons resulting from faulty installation, repair or modification of the article and misuse or negligent operation or use of the article, whether or not such damage to property or injury to persons may be caused by defective material, workmanship, or construction. ***ADVISORY***: *Winches and hoists are not approved for lifting or handling personnel or persons unless specifically approved in writing from Seller for the specific intended application.*

Under no circumstances shall Seller be liable (i) for any damage or loss to any property other than the warranted article or part thereof, or (ii) for any special, indirect, incidental, or consequential damage or loss, even though such expenses, damages, or losses may be foreseeable.

The foregoing limitations on Seller's liability in the event of breach of warranty shall also be the absolute limit of Seller's liability in the event of Seller's negligence in manufacture, installation, or otherwise, with regard to the articles covered by this Warranty, and at the expiration of the Warranty period as above stated, all such liabilities shall terminate. Buyer’s purchase of any article(s) covered by this Warranty shall constitute acceptance of the terms and conditions hereof and shall be binding upon Buyer and Buyer’s representatives, heirs and assigns. The laws of the State of Oklahoma shall govern Buyer’s rights and responsibilities in regard to this Warranty and the transaction(s) subject thereto, and the State of Oklahoma shall be the exclusive forum and jurisdiction for any action or proceedings brought by Buyer in connection herewith or any dispute hereunder. If any of the terms and conditions contained within this Warranty are void, the remaining provisions thereof are and shall remain valid and enforceable.

**Note:** *Prices and specifications contained in this price book are subject to change without notice.*