

# CORDEM Corporation

PBW-13PB



## **GOLO** Power Winch Operation Manual

For all winches using the push-button control

## **Warnings and Disclaimers**

CORDEM and any other sellers hereby disclaim any liability or responsibility whatsoever for any injuries or damages resulting from improper use of the GOLO Power Winch, which includes: use for human support or transportation; use with loads surpassing CORDEM specifications; operation with drum cable that is worn, inferior, damaged, or below CORDEM safety factor specifications; placing excess cable on drum (which may cause slippage of cable over a drum flange); use of hooks without safety latches; insufficiently secured winches or loads; positioning of persons or property below or too near loads; unauthorized modification or repair of winches; incorrect use of controls; and failure to follow this Operation Manual. All warranties are strictly limited to the terms and conditions of the warranty card which accompanies each GOLO Power Winch.

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## MODEL

### Designation Codes

<b>Winch Series:</b>	<b>12</b> = 1200 lb Rating*	<b>7</b> = 700 lb Rating*
<b>Voltage:</b>	<b>15</b> = 115 Volt	<b>30</b> = 230 Volt
<b>Switch Location (MO and MA):</b>	<b>S</b> = Standard	<b>R</b> = Remote (10 ft remote cord)
<b>Switch Type:</b>	<b>MO</b> = Rotary Momentary Switch	<b>MA</b> = Rotary Maintained Switch
	<b>RPNT</b> = Remote Push Button Pendant (10 ft. remote cord, additional lengths available)	
	<b>LVC</b> = Low Voltage Control	
<b>Quick-Disconnect:</b>	<b>X</b> = Quick-Disconnect is installed	
<b>Examples:</b>	12-15 RPNT, 7-30 RMOX, 12-30 LVC	

**Note:** Only the RPNT Control is covered in this manual. The RPNT is currently only available for 115VAC. Gearbox and Motor information applies to all models.

\*See Safety Rule 5 on page 3 for an explanation of load rating.

### Identification

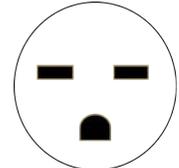
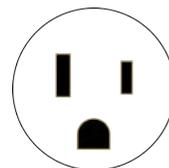
If the Model and Serial Number Label (Figure 1) is missing, the winch's model may be determined through the following:  
**Series:** Running with no load, the 1200 series gearbox will turn the drum at approximately 33 RPM, while the 700 series will turn it at approximately 66 RPM.

**Voltage:** The voltage may be determined by looking at the plug shape (Figure 2). CORDEM uses a standard NEMA 5-15 plug for 115 Volt models, and a NEMA 6-15 plug for 230 Volt models.

**Switch Type:** SMO and SMA controls are mounted on the control box. RPNT, RMO, and RMA controls are mounted on a pendant attached to the control box. The RMO and RMA have a rotary switch, while the RPNT has push buttons.



Model and Serial Number Label Location  
**Figure 1**



NEMA 5-15 (115 Volts) NEMA 6-15 (230 Volts)  
**Figure 2**

# TECHNICAL SPECIFICATIONS

The duty cycle of the winch with a full load allows for 1 minute of continuous operation, followed by 1 minute of rest. At half load, the winch may be run continuously.

Max. Weight: 38 lb (17.25 kg) (cable not included)  
 Height: 7.5 in (19 cm)  
 Width: 8.3 in (21 cm)  
 Length: 20.75 in (52.7 cm)

\*The maximum number of layers varies with cable diameter

Series	Layers of Cable around Drum	Lift Capacity (lb)	Line Speed (ft/min)		
			In	Out	No Load
1200	1 Full*	1200	17	37	28
		700	25	54	41
700	1 Full*	700	34	76	56
		400	50	112	82

Double Drum values will differ. See page 9 for details.

## INSTALLATION

### Mounting

1. The winch must be bolted onto a strong, stiff support.
2. Allow a safe operating area around the winch in order to avoid accidental contact with the cable or load.
3. Center the drum to the load. This will help to prevent the cable from winding onto one side and spilling over the flange.
4. Mount the winch level to a horizontal load to ensure that the winch is not unnecessarily strained.
5. To allow proper spooling of the cable, the fleet angle should be no more than 1.5° (Figure 3). The minimum distance between the winch and a load or pulley should be 11 ft (4 m), assuming that a drum divider is not being used.

**Caution:** Do not mount the winch in the base-vertical, drum-down position (Figure 4), as this will cause a gear set to rise above the oil level. All other horizontal and vertical positions are acceptable.

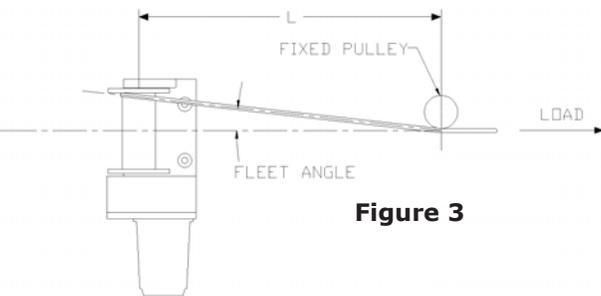


Figure 3

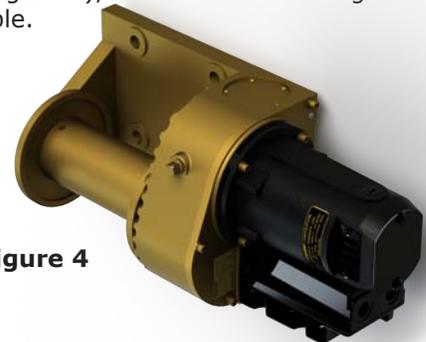
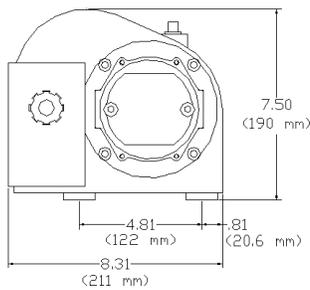
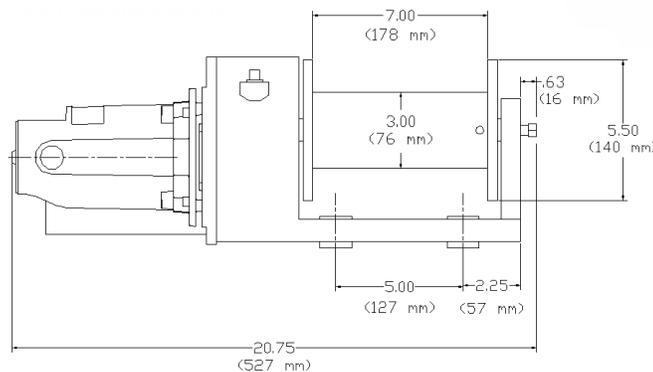


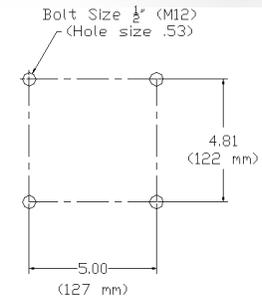
Figure 4



End View



Side View



Mounting Hole Pattern

Figure 5

### Electrical Power

Before connecting the winch to a power source, consider the following:

1. Extension cords are potentially dangerous. We recommend using 12 gauge wire for cords exceeding 20 ft (6 m). Circuits for 115 VAC winches should be rated for 20 amps.
2. Never operate your power winch without first grounding it. If a 3-prong outlet is not available, use a standard adapter plug, making sure to connect the adapter ground wire.
3. RPNT controls will not start the winch if a button is pressed at the same time as the power cord is plugged in.

### Use in Wet Environments

Since the motor is not totally enclosed, it should be protected when operating under inclement weather conditions or near splashing water. We offer a Motor and Switch Box Shield (Model ACP-12, Part Number 101081). Although the motor shield does not completely enclose the motor, it does help to protect the motor from moisture entering from the top. Always protect the electrical controls from moisture as much as possible.

# SAFETY

1. Before operating the winch, ensure that it is properly installed (Page 2).
2. Never use the winch for any type of human support or transportation.
3. Cordem specifies a minimum cable safety factor of 5:1. This means the cable should be capable of supporting 5 times the intended load. We also recommend the use of safety latches on all hooks.
4. A minimum of 5 wraps of cable should be kept around the drum at all times. This reduces the load on the cable retaining bolt.
5. The number of layers of cable on the drum greatly affects the maximum load of the winch. Depending on the layer, a 1200 series winch will lift between 1200 and 700 lb (545-315 kg), and a 700 series will lift between 700 and 400 lb (315-180 kg). The maximum load decreases to the lower value as more layers are spooled around the drum, due to increasing torque. This effect may be eliminated through the use of a double drum.

# RPNT CONTROL

## Push Buttons

On our push button controls, all motor and drum direction control is accomplished through the use of the "In" and "Out" buttons. The buttons are both located on a pendant wired to the control box.

To operate the GOLO Power Winch, press either the "In" or "Out" button. When the load reaches the desired location, release the button (the "In" and "Out" positions are momentary). Braking is initiated by the release of the buttons, or by pressing both buttons at the same time.

## LEDs

The RPNT control box features 3 LEDs which indicate the status of the winch:

**Green**, Power On: This LED lights when the winch is connected to a power source.

**Yellow**, Winch Running: This LED lights as the winch is moving its load.

**Red**, Overheat: This LED lights when the temperature control detects a problematic amount of heat in the control box. This condition will also immediately stop the winch. Once the LED turns off, the winch is cool enough to run again.

## Dual Controls

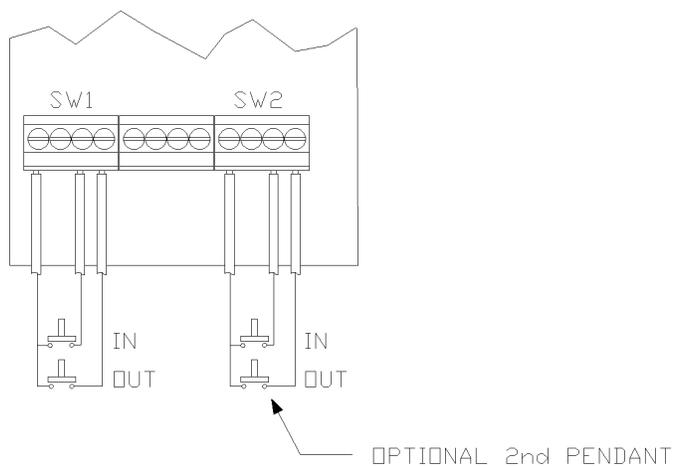
It is possible to wire a second control pendant to the RPNT control box. The controls are wired in parallel, meaning only one needs to be activated to start the winch. However, it should be noted that the "In" and "Out" buttons must be released on both control pendants for the winch to stop. Both controls are wired to the controller board (Figure 6).

## Limit Switches

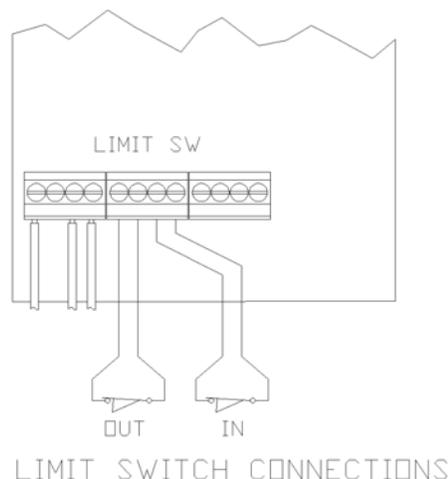
Limit switches can be used to stop the winch when the load reaches the switch.

Limit switches should be rated for 24 VDC and 30 mA. The switches can be wired either in series with the pendant switch or can be attached directly to the Controller Board inside the RPNT box (Figure 7). When a limit switch is hit, the winch will still be able to operate in the other direction, and braking will function as normal. Limit switches may be set up in either or both directions for the RPNT.

**Note:** Remove jumpers on the limit switch terminal block before attaching limit switches.



Pendant Wiring (1 or 2 pendants)  
**Figure 6**



Limit Switch Wiring  
**Figure 7**

## MAINTENANCE

### Authorized Service Under Warranty

Should any service difficulties arise while your winch is under warranty, contact your nearest distributor; if they cannot help you, contact CORDEM directly. Repair work performed by anyone who has not received specific instructions from or been specifically authorized by CORDEM Corporation will automatically void all warranty conditions of the product.

### Braking System Maintenance

All GOLO Power Winch models incorporate the Trigger-Duodynamic braking system, along with self-locking worm gearing. This dynamic braking system dissipates energy by, in effect, turning the motor into a generator. This begins the process of converting kinetic energy into heat in the dynamic brake resistor. The self-locking worm gear arrangement then holds the load in place.

If you notice performance issues, including abrupt stopping of the load during the braking cycle, a delay before braking begins, the load moving slightly after the braking cycle, or a dramatic increase in arcing on the motor brushes, the load should be removed immediately and maintenance should be performed. We advise checking the brushes for loose wires and using a commutator stone to clean and condition the commutator surface.

### Preventive Electrical Maintenance

**Electrical Contacts:** Check that all electrical connections and leads to the switch contacts are joined securely.

**Brush Replacement:** After replacing the brush (or armature), reseal the brushes by running the motor in both directions without any load until complete seating has occurred.

### Power Supply Issues

If the winch repeatedly starts and stops, the incoming voltage may be too low. This will also cause the green LED to blink. The voltage at the winch power cord needs to be at least 100 VAC when under load. Note that the measured voltage at the outlet will decrease when the winch is under load. Extension cords are often a problem. Make sure they are rated for the full 17 amps the winch can draw.

## LUBRICATION

Throughout the operating life of the winch, make sure that the lubricant level is maintained at 2-1/8" (5.4 cm) below the top of the filler plug opening (Figure 8). This is slightly less than 1 quart (950 milliliters) of oil. Too much lubricant will cause overheating; too little will cause gear failure.

The first change of the gear case lubricant should be performed after 50 hours of normal operation. After that, change the oil again every 250 hours of use. To change the oil, unscrew the filler plug and tip the winch upside-down until the case is completely drained. We suggest you use a light flushing oil next, then thoroughly drain it out. After this second draining, place the winch in its normal, upright position and refill the gear case to the proper level with new gear lubricant.

We recommend Mobilgear 600 XP 320 lubricating oil. Acceptable alternatives include ConocoPhillips Compounded Gear Oil-7, and synthetic oils such as Texaco Pinnacle, Shell Hyperia, Royal Purple Synergy, and Mobil SHC 634. These are all high-grade worm gear lubricants for enclosed gear boxes, with an S.S.U. viscosity of at least 22 centistokes at 210°F (100°C). This corresponds with American Gear Manufacturers Association Grade 6. If you cannot obtain the proper worm gear lubricant, it is possible (on a temporary basis only) to use an SAE 90 automotive gear oil, which is likely available at a local gasoline station.

**Note:** No additional lubrication is necessary. All outside bearings are pre-lubricated and sealed.

**Caution:** Never check the gear case lubricant or fill with oil while the winch is running.

**Caution:** Avoid all lubricants that are not compatible with bronze gears. Some (especially older) EP lubricants are not compatible.

### Temperature

It is very important to use a lubricant with a pour point 20°F (11°C) lower than the coldest expected temperature. We recommend using synthetic oils if ambient temperatures fall below 30°F (-1°C), or exceed 100°F (38°C).

## CABLE

### Selection

The following table can help you select the proper cable for your particular application. We recommend galvanized aircraft cable (7x19) for the winch drum because of its combination of strength, flexibility, and corrosion resistance.

**Note:** Cordem specifies a minimum cable safety factor of 5:1, and recommends using safety latches on all hooks.

Cable Diameter (in)	Drum Capacity (ft)*	Breaking Strength (lb)**	Maximum Operating Load (lb)
1/8	512	2000	400
5/32	325	2800	560
3/16	215	4200	840
7/32	165	5600	1120
1/4	135	7000	1400

\*Usable cable length is about 4' less, as the first five cable wraps should always remain on the drum for safe operation.

\*\*Based on galvanized aircraft cable, 7x19.

### Attachment

The cable lock bolt fastens the cable in place (Figure 8). To attach a cable, push the cable through to the opposite end of the hole, but be sure it doesn't protrude beyond the hole. This would cause it to interfere with the normal wrap of the cable on the drum. Tighten the cable lock bolt firmly.

**Note:** The cable must be wrapped up in the correct direction around the winch drum. The proper direction is established when the cable follows the groove that leads from the cable hole.

## DISASSEMBLY

### Oil and Housing Cover

1. Pour the oil out of the gear box.
2. Remove the housing cover (100102) by removing the five screws on the outer edge of the housing cover's face, along with the upper right screw holding the motor to the housing cover.

**Caution:** Whenever the cover is removed from the housing, be sure that the inside of the gear box is clean of all dirt and particles before reassembling.

### Gearbox

1. Remove the ten side cover screws (100253), both side covers (100251), and o-rings (100250). Earlier models will have gaskets (100252) instead of o-rings.
2. Remove the elastic stop nut (100213), which is at the end of the cross shaft. Then remove the cross shaft.
3. Remove the double roll pin (100214), which holds the drum to the drum shaft, and pull the worm gear (100406 or 100438) and drum shaft out of the housing.

**Caution:** Do not pull the drum shaft out without first removing the cross shaft. Doing so will damage the gear teeth.

### Motor

1. After removing the housing cover as described above, remove the worm (100109) from the motor shaft.
2. Remove the 3 screws (100244) which hold the motor to the housing cover, and pull the motor from the housing cover.

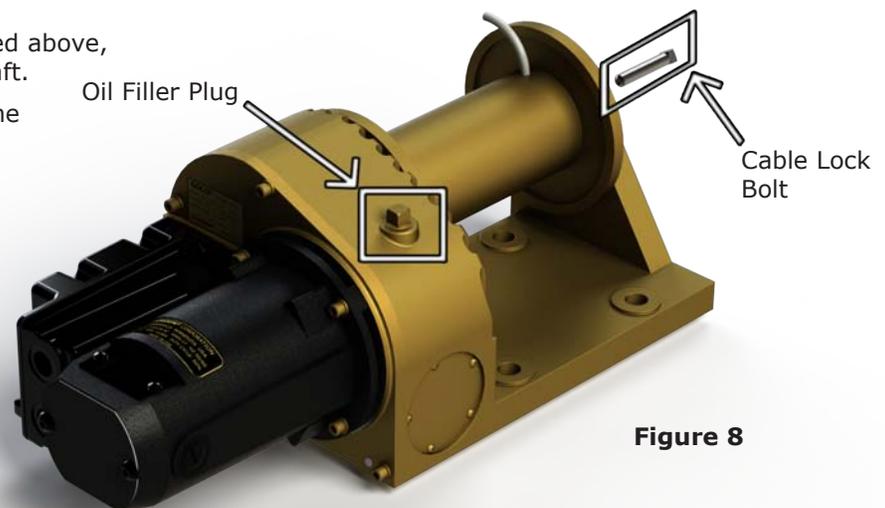
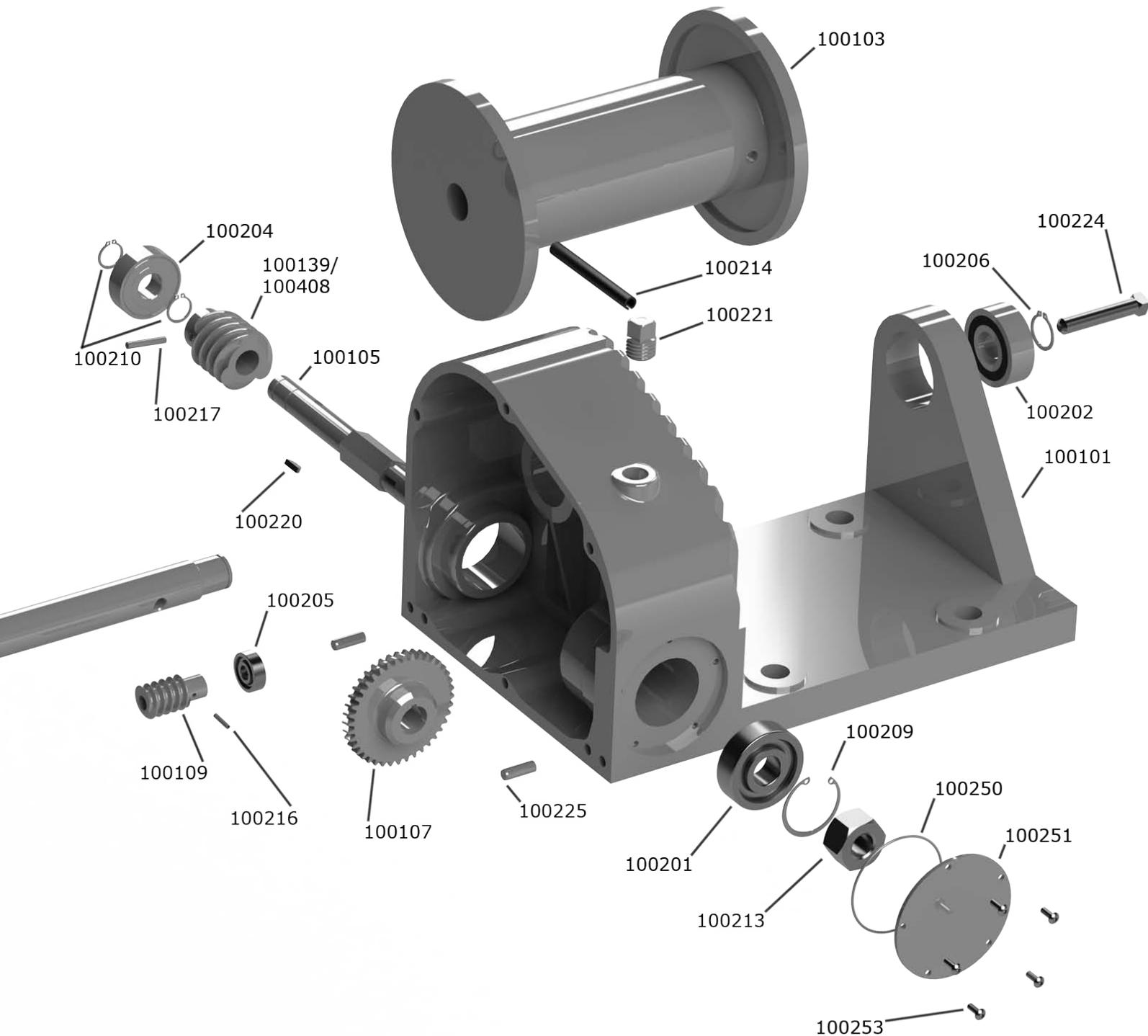


Figure 8





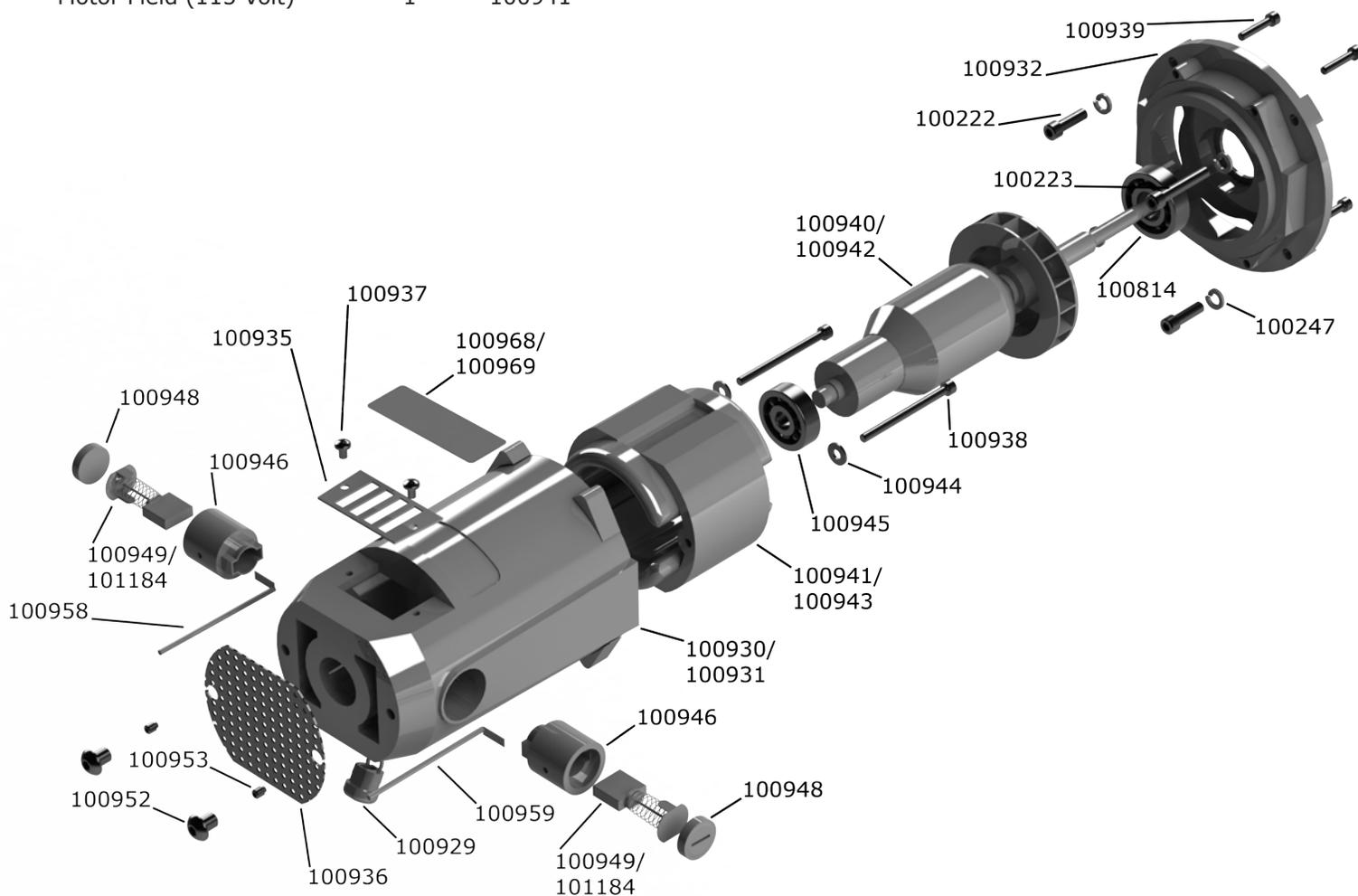
## Reassembly Notes:

1. CORDEM recommends applying Loctite 515 on the housing (100101) and cover (100102) prior to installing the housing gasket (100249).
2. Verify that the motor shaft bearing (100205) is seated in the housing.
3. Ensure that the output gear (100406 or 100438) is seated. The hub of the gear should be level to the top of the housing within .015 inches. If it's too high, the thrust bearing (100298) and washers (100299) are not seated on the gear.
4. Use an anti-galling lubricant on the pipe plug (100221).

# Motor Assembly

Description	Quantity	Part Number	Description	Quantity	Part Number
1/4-20 x 7/8 Socket Head Cap Screw	3	100222	Motor Armature (230 Volt)	1	100942
1/4-20 x 1 1/2 Socket Head Cap Screw	1	100223	Motor Field (230 Volt)	1	100943
Washers	4	100247	#10 ID, .50 OD Washer	2	100944
Spade Terminals (Not shown)	4	100666	Motor Bearing	1	100945
Heat Shrink Tubing (Not shown)	1	100790	Brush Holder	2	100946
Motor Bearing	1	100814	Brush Cap	2	100948
Grommet	1	100929	Brush Set (115 Volt)	1*	100949
Motor Body (115 Volt)	1	100930	5/16-18 x 3/8 Button Head Cap Screw	2	100952
Motor Body (230 Volt)	1	100931	#10-32 x 1/4 Half Dog Point Screw	2	100953
Motor Flange	1	100932	Motor Lead Wire (Black)	1	100958
Brush Access Cover	1	100935	Motor Lead Wire (Blue)	1	100959
Cover Screen	1	100936	Motor Label (115 Volt)	1	100968
Brush Access Cover Screw	2	100937	Motor Label (230 Volt)	1	100969
#10-32 x 2 1/2 Socket Head Cap Screw	2	100938	Brush Set (230 Volt)	1*	101184
#10-24 x 1 Socket Head Cap Screw	4	100939			
Motor Armature (115 Volt)	1	100940			
Motor Field (115 Volt)	1	100941			

\*This part is a set of 2 brushes.



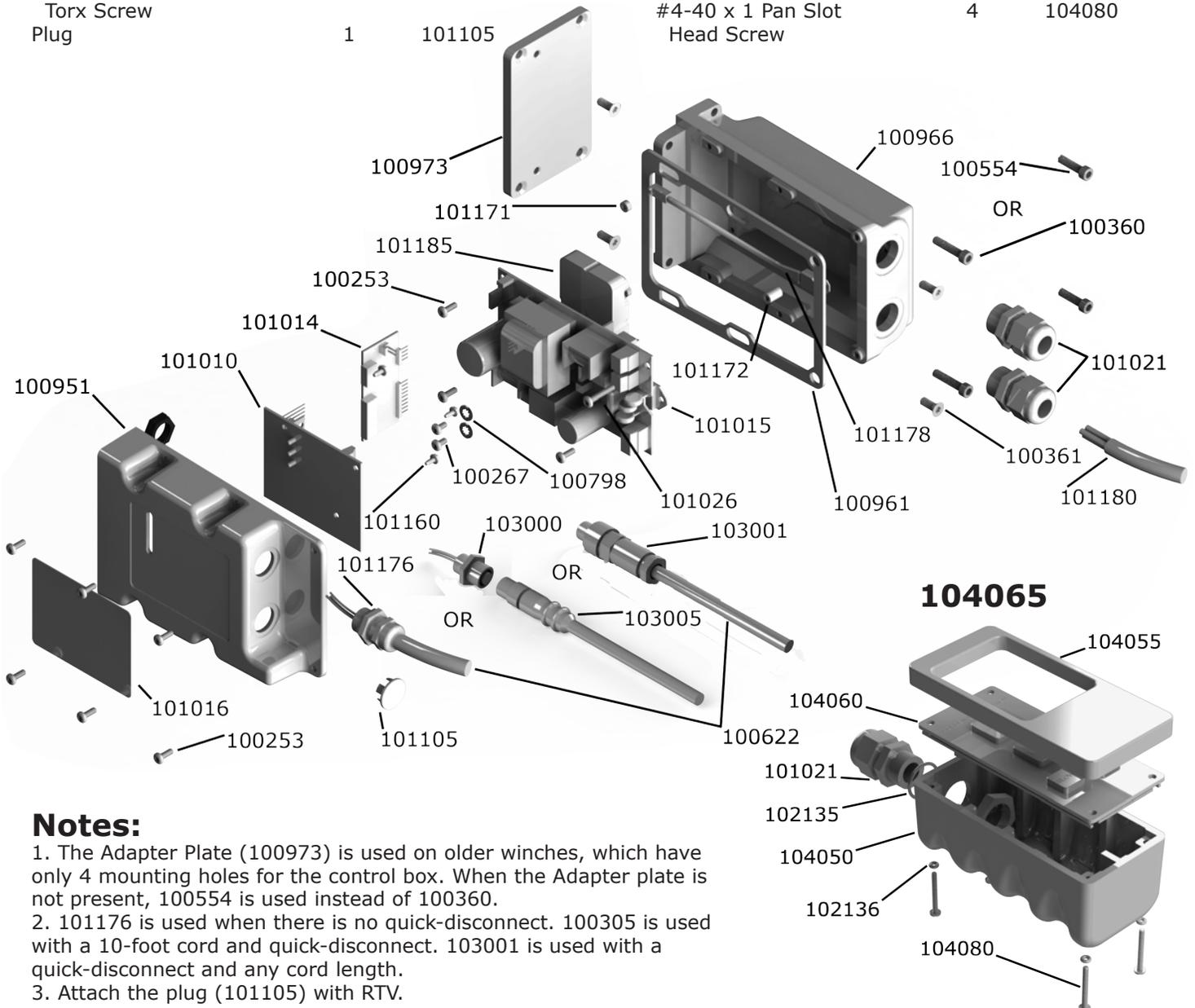
## RPNT Assembly

Description	Quantity	Part Number
#6-32 x .38 Pan Head Torx Screw	9	100253
Brake Resistor Screw	2	100267
#10-24 x .75 Socket Head Cap Screw	2	100360
#10-24 x .50 Flat Head Torx Screw	4	100361
#10-24 x .62 Socket Head Cap Screw	2	100554
Pendant Cord (Per foot)	1	100622
Brake Screw Washer	2	100798
Control Housing Cover	1	100951
Rubber Gasket	1	100961
Control Housing	1	100966
Adapter Plate	1	100973
Controller Board Assembly	1	101010
Connector Board Assembly	1	101014
Relay Board Assembly	1	101015
LED Decal	1	101016
Cord Grip (Includes nut)	2	101021
#6-32 x .75 Pan Head Torx Screw	1	101026
Plug	1	101105

Description	Quantity	Part Number
#4-40 Hex Head Screw	3	101160
Relay Board Spacer	2	101171
Relay Board Spacer (Long)	1	101172
Metal Cord Grip (Includes nut)	1	101176
Thermostat Assembly	1	101178
RPNT Power Cord	1	101180
Brake Resistor	1	101185
Heat Shrink Tubing (Not shown)	1	101188
Cable Connector	1	103000
Attachable Connector	1	103001
10' Pendant Cord (With integrated connector)	1	103005

## Pendant Assembly 104065

.746 O-Ring	1	102135
.140 O-Ring	4	102136
Pendant Housing	1	104050
Pendant Cover	1	104055
Switch Assembly	1	104060
#4-40 x 1 Pan Slot Head Screw	4	104080

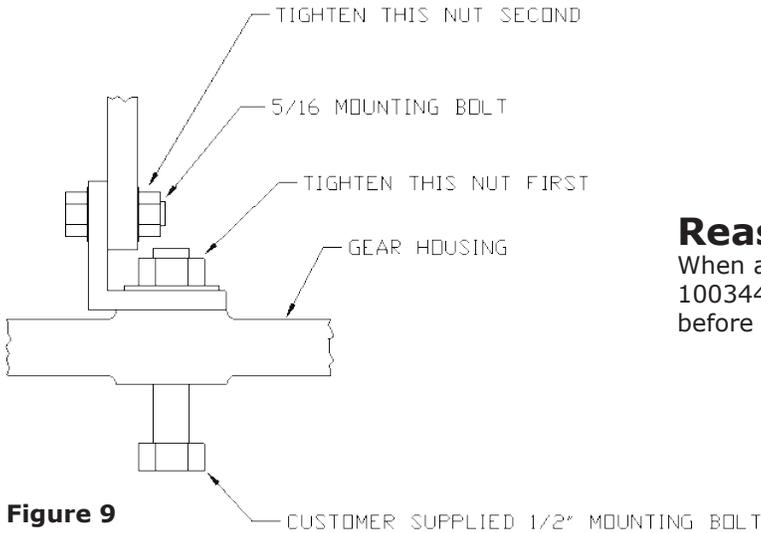
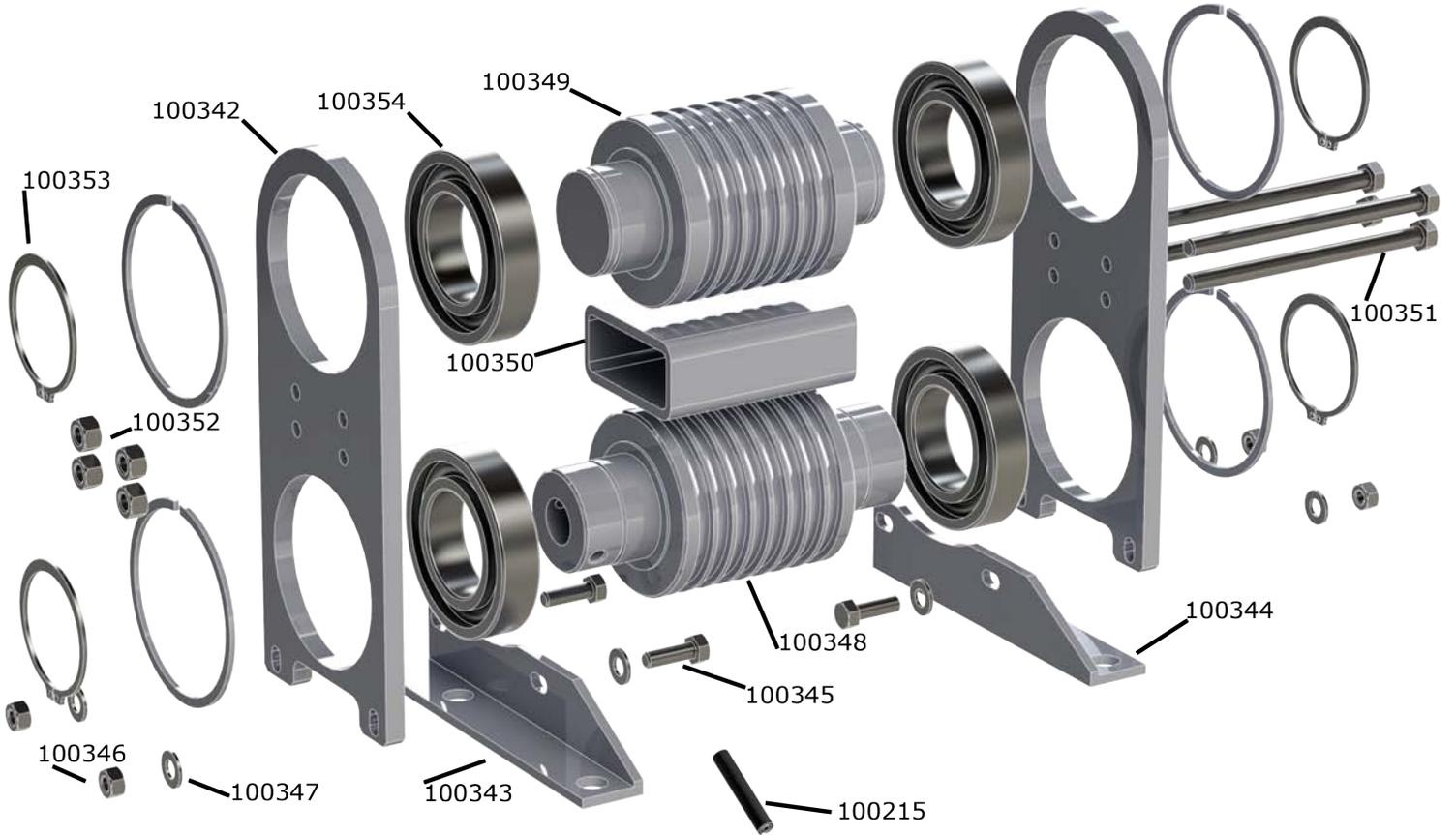


### Notes:

1. The Adapter Plate (100973) is used on older winches, which have only 4 mounting holes for the control box. When the Adapter plate is not present, 100554 is used instead of 100360.
2. 101176 is used when there is no quick-disconnect. 103005 is used with a 10-foot cord and quick-disconnect. 103001 is used with a quick-disconnect and any cord length.
3. Attach the plug (101105) with RTV.

# Double Drum

Description	Quantity	Part Number	Description	Quantity	Part Number
Roll Pin	1	100215	8-Groove Drum (Driver)	1	100348
Side Plate	2	100342	7-Groove Drum (Idler)	1	100349
Left Bracket	1	100343	Spacer Bar	1	100350
Right Bracket	1	100344	3/8-16 x 5-1/2 Hex Cap Screw	4	100351
5/16-18 x 1 Hex Cap Screw	4	100345	3/8-16 Hex Nut	4	100352
5/16-18 Hex Nut	4	100346	Drum Snap Ring	4	100353
5/16 SAE Washer	8	100347	Drum Bearing	4	100354



## Reassembly Note:

When attaching to the winch, the brackets (100343 and 100344) should be securely attached to the housing (100101) before tightening the cross screws (100345) (Figure 9).

# DOUBLE DRUM

## Theory of Operation

The cable enters the drum assembly on the lower drum, wraps between the lower and upper drums and then is fed out from the lower drum (Figure 10). The cable grooves on the drums are circular, not helical, which permits continuous feed of the cable in either direction.

The driving force on the cable is developed by the successive wraps on the power drum. The tension increment in each wrap over the power drum will be  $T_2/T_1 = e^{uB}$  wherein:

$T_2$  = tension out

$T_1$  = tension in

$u$  = coefficient of friction

$B$  = arc of contact (in radians)

$e$  = base of the natural logarithm system (2.718)

The coefficient of friction is normally .10 or greater, even with oil or grease on the cable. The arc of contact is 180 degrees, or  $\pi$  radians. Therefore, the tension increment per 180-degree wrap on the power drum is:

$$T_2/T_1 = 2.718^{(.1)(3.14)} = 1.369$$

Depending on the direction of approach of the cable from the external loop, there will be 6, 7, or 8 half-wraps of cable on the power drum, giving an overall ratio of:

$$(1.369)^6 = 6.58 \text{ for 6 half-wraps}$$

$$(1.369)^7 = 9.01 \text{ for 7 half-wraps}$$

$$(1.369)^8 = 12.33 \text{ for 8 half-wraps}$$

The minimum line tension to develop the 1200 lb capacity of the winch (1200 series) will then be:

$$1200/6.58 = 182\# \text{ for 6 wraps}$$

$$1200/9.01 = 133\# \text{ for 7 wraps}$$

$$1200/12.33 = 97.3\# \text{ for 8 wraps}$$

This shows that moderate initial tension in the outer cable loop is sufficient to deliver the winch's rated force to drive the cable. Cable tension may be controlled by the use of a turnbuckle or by use of an adjustment pulley in the cable circuit. We recommend a cable diameter of  $\frac{1}{4}$ ".

## Mounting

When the cable approach is from the top, there are two options for attaching the cable to the drums. The favored approach is to use pulleys to spread the cables out so they can reach the driving (bottom) drum without touching the idler drum (Figure 11). This allows you to use all 8 grooves of the driving drum. Alternately, you can place the incoming and outgoing cable along the outermost grooves of the idler drum (Figure 12). This limits you to using only the 6 inner grooves of the driving drum.

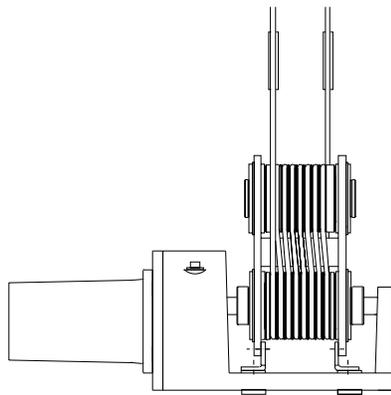


Figure 11

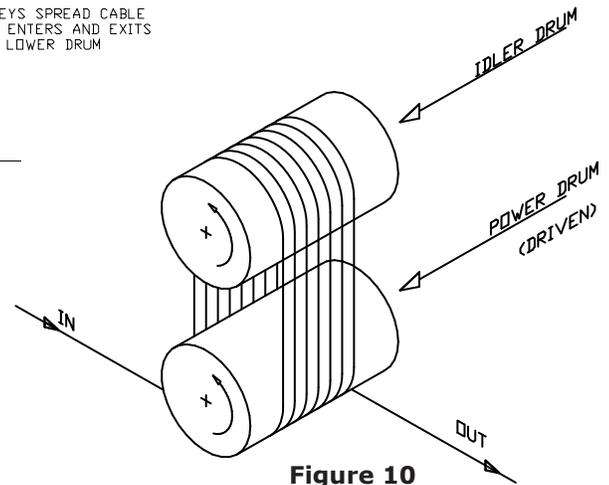
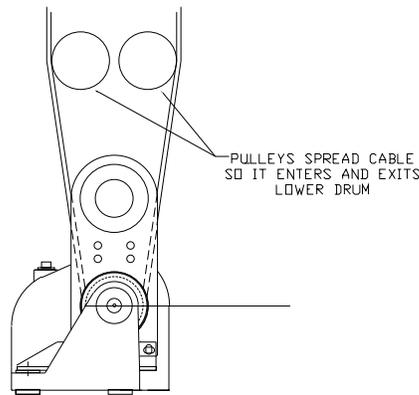


Figure 10

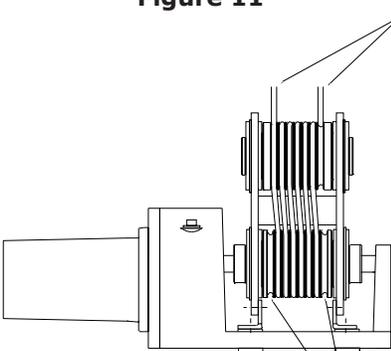


Figure 12

CABLES RIDE IN OUTSIDE GROOVES OF UPPER DRUM

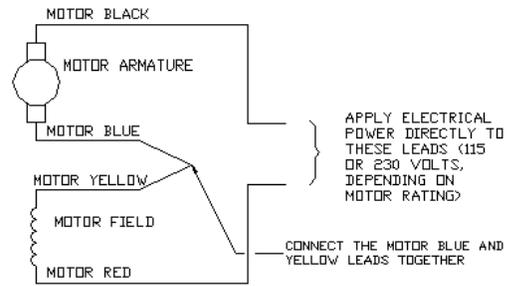
OUTER GROOVES OF DRIVER DRUM ARE NOT USED

# ELECTRICAL DIAGRAMS

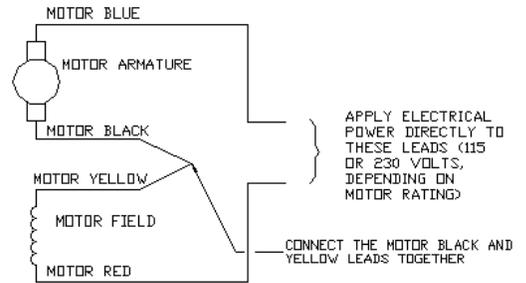
If the control fails in the winch, or you suspect other electrical problems, you can connect power directly to the winch motor (Figure 13).

1. Disconnect the 4 motor lead wires from the rest of the control.
2. Connect 2 of the wires directly together.
3. Connect the remaining 2 motor wires directly to the AC Supply.

**Caution:** This will prevent the winch's Dynamic Brake from functioning. When lowering a load, the load may not stop when power is removed. Cycle the power on and off to prevent the load from lowering too quickly.

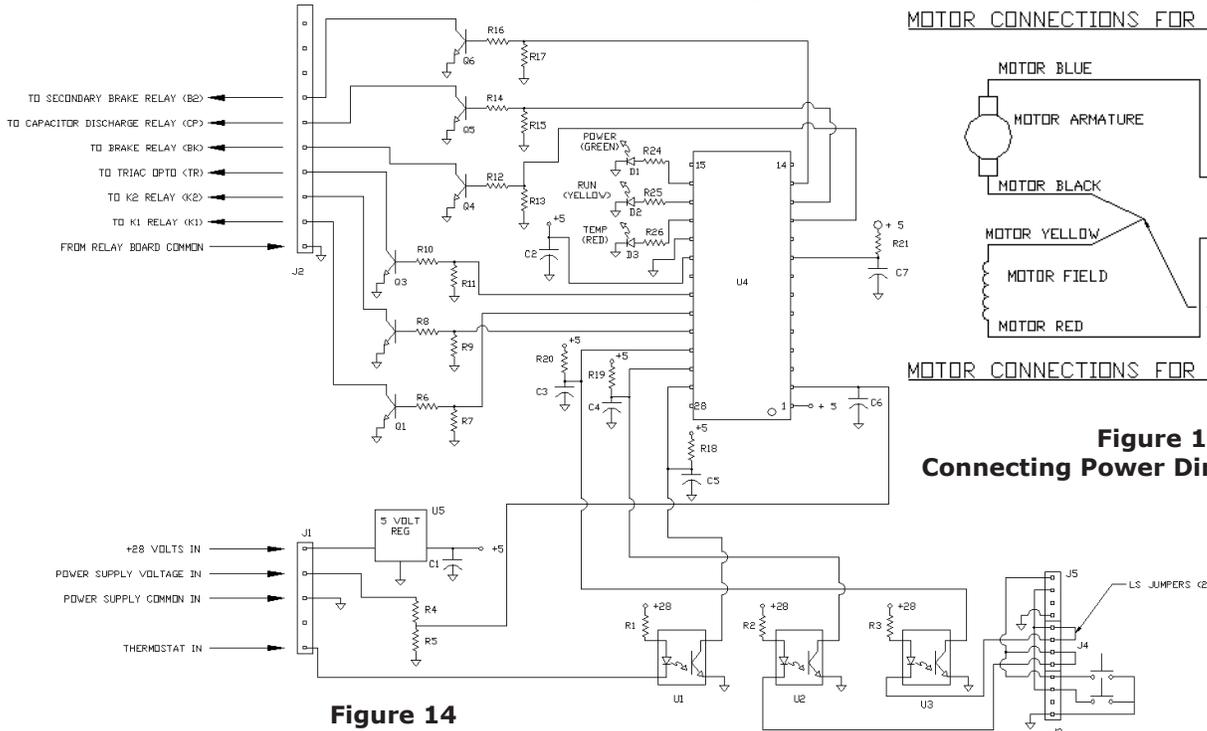


MOTOR CONNECTIONS FOR "IN" DIRECTION

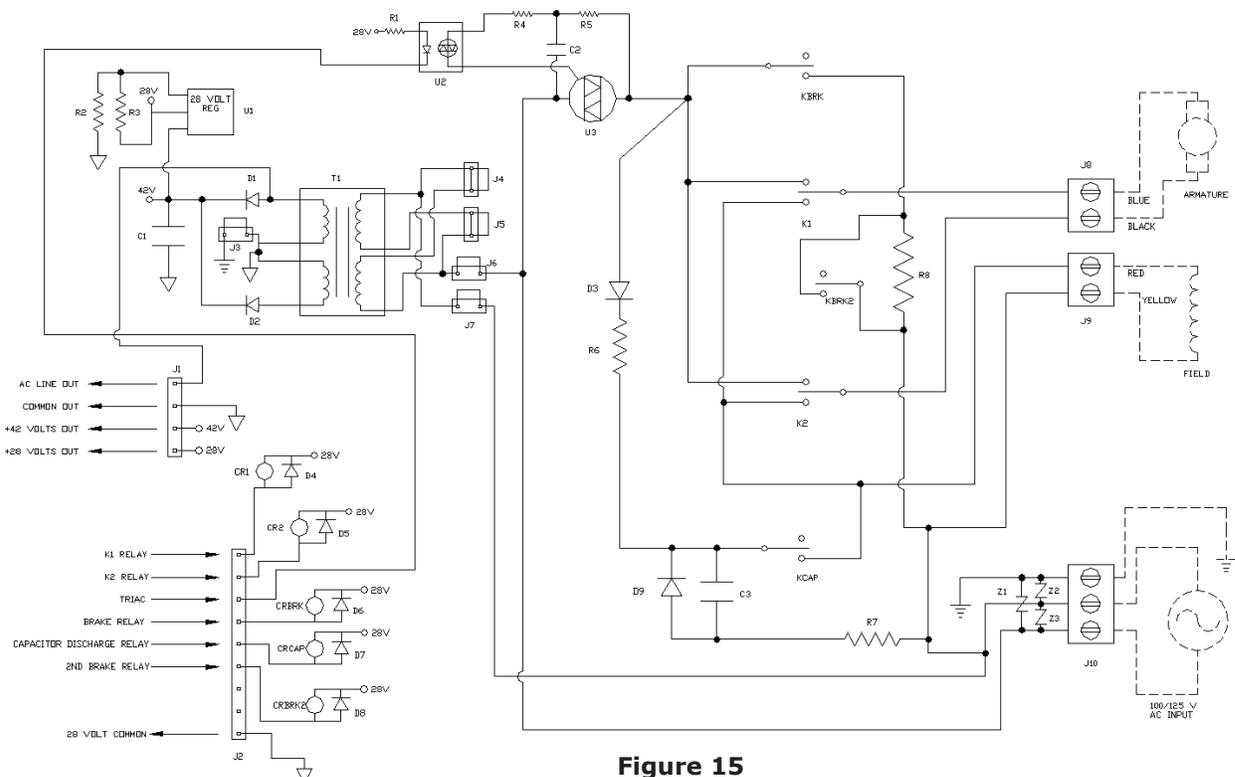


MOTOR CONNECTIONS FOR "OUT" DIRECTION

**Figure 13**  
Connecting Power Directly to Motor



**Figure 14**  
RPNT Controller Board



**Figure 15**  
RPNT Relay Board



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