Gorbel® Dealer: ________________________________

Serial Number: ________________________________

Gorbel® Customer Order No.: ____________________

Date: _________________________________________
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SAFE HOIST OPERATING GUIDELINES

General
There is no one single factor that is more important for minimizing the possibility of personal injury to the operator and those working in the area, or damage to property, equipment, or material, than being familiar with the equipment and using Safe Operating Practices.

Hoists/trolleys are designed for lifting and transporting of material only. Under no circumstances, either during initial installation or in any other use, should the hoist be used for lifting or transporting personnel.

No operator should be permitted to use the equipment that is not familiar with its operation, is not physically or mentally fit, or has not been schooled in safe operating practices. The misuse of hoists can lead to certain hazards which cannot be protected against by mechanical means; hazards which can only be avoided by the exercise of intelligence, care, and common sense.

Safe Operating Practices also involve a program of periodic inspection and preventative maintenance (covered in separate section). Part of the operator’s training should be an awareness of potential malfunctions/hazards requiring adjustments or repairs, and bringing these to the attention of supervision for corrective action.

Supervision and management also have an important role to play in any safety program by ensuring that a maintenance schedule is adhered to, and that the equipment provided for the operators is suitable for the job intended without violation of one or more of the rules covering safe operating practices and good common sense.

The Safe Operating Practices shown are taken in part from the following publications:
- American National Standard Institute (ANSI)
- Safety Standards for Crane, Derricks, Hoists
- ANSI B30.2 - Overhead and Gantry Cranes
- ANSI B30.16 - Overhead Hoist

Do's and Don'ts (Safe Operation of Hoists)
The following are Do's and Don'ts for safe operation of overhead hoists. A few minutes spent reading these rules can make an operator aware of dangerous practices to avoid and precautions to take for his own safety and the safety of others. Frequent examinations and periodic inspections of the equipment as well as a conscientious observance of safety rules may save lives as well as time and money.

DON'TS - HOISTS
1. Never lift or transport a load until all personnel are clear and do not transport the load over personnel.
2. Do not allow any unqualified personnel to operate hoist.
3. Never pick up a load beyond the capacity rating appearing on the hoist. Overloading can be caused by jerking as well as by static overload.
4. Never carry personnel on the hook or the load.
5. Do not operate hoist if you are not physically fit.
6. Do not operate hoist to extend limits of travel of cable without first checking for proper limit switch action.
7. Avoid sharp contact between two hoists or between hoist and end stops.
8. Do not tamper with or adjust any parts of the hoist unless specifically authorized to do so.
9. Never use the load cable as a sling.
10. Do not divert attention from load while operating hoist.
11. Never leave a suspended load unattended.
12. Do not use limit switch(es) for normal operating stop(s). These are safety devices only and should be checked on a regular basis for proper operation.
13. Never operate a hoist that has an inherent or suspected mechanical or electrical defect.
14. Do not use load cable as ground for welding. Never touch a live welding electrode to the load cable.
15. Do not jog controls unnecessarily. Hoist motors are generally high torque, high slip types. Each start causes an inrush of current greater than the running current and leads to overheating and heat failure, or burnout, if continued to excess.
16. Do not operate hoist if load is not centered under hoist.
17. Do not operate hoist if cable is twisted, kinked or damaged.
18. Do not remove or obscure label.
19. Do not permanently activate dead man’s switch.

DO'S - HOISTS
1. Read and follow manufacturer’s instruction, installation, and maintenance manuals. When repairing or maintaining a hoist, use only manufacturer’s recommended parts and materials.
2. Read and follow all instruction and warning information on or attached to a hoist.
3. Remove the hoist from service and thoroughly inspect and repair, as necessary, if unusual performance or visual defects (such as peculiar noise, jerky operations, travel in improper direction, or obviously damaged parts) are noticed.
4. Establish a regular schedule of inspection and maintain records for all hoists with special attention given to hooks, load cables, brakes, and limit switches.
5. Check operation of brakes for excessive drift.
6. Never lift loads over people, etc.
7. Check for damaged hooks and load cable.
8. Keep load cable clean and well maintained.
9. Check the load cable for improper seating, twisting, kinking, wear, or other defects before operating the hoists.
10. Make sure a load clears neighboring stockpiles, machinery, or other obstructions when raising, lowering, or traveling the load.
11. Center hoist over load before operating.
12. Avoid swinging of load or load hook when traveling the hoist.
13. Be sure the load attachment is properly seated in the saddle of the hook. Balance load properly before handling. Avoid hook tip loading.
14. Pull in a straight line, so that neither hoist body nor load cable are angled around an object.
15. Take up slack slowly.
16. Know the hand signals for hoisting, cross travel, and crane travel if working with cab-operated hoists or cranes. Operators should accept the signals of only those persons authorized to give them.
<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check Wire Rope for improper seating, twisting, kinking, wear or defects before operating.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center BX G-Force® over the load before lifting. DO NOT end or side load the BX G-Force®. End or side loading will seriously reduce the life of the Wire Rope and lead to premature failure. The Wire Rope should never exceed an out of vertical angle greater than 20°, under any circumstances.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoid swinging of load or load hook when traveling with the BX G-Force®.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check the Coil Cord for improper seating, twisting, kinking, wear or defects before operating. Any of the described conditions will seriously reduce the life of the Coil Cord and lead to premature failure.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Press Float Mode (option) button with only the load weight hanging from the unit. Additional external forces applied to the load during initiation of Float Mode will result in the load drifting.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not repeatedly impact the BX G-Force® into the end stops. This condition will seriously reduce the life of the Controls and could lead to premature failures. If the unit impacts the end stop more than 10 times in a single shift, contact Gorbel® Customer Service for alternative end stop options.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>The BX G-Force® ILD does not meet “Wash-down” environment requirements. The BX G-Force® ILD does not meet “Explosion Proof” requirements.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure that the Load Cell is properly mounted in Remote Mount Handle applications with Float Mode (reference Figure I6, page 63).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure that the Handle is supported properly in Remote Mount Handle applications by attaching tooling at both the Top and Bottom mounting points (reference Figures H1, I5 &amp; I6, on pages 57, 62, &amp; 63).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not mount any objects to the sliding portion of the G-Force® Handle (i.e. switches). Additional objects may interfere with the travel of the sliding Handle, and affect the overall speed and functionality of the unit.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not mount any load bearing components to the Blue Poly-carbonate housings of the G-Force® Handle or Actuator assembly.</td>
</tr>
</tbody>
</table>
G-Force® Operational Guidelines

All operators should read the G-Force® Instruction, Installation and Maintenance Manuals before operating the unit. Please follow the instructions contained in these manuals for your safety and for optimum trouble-free operation of your G-Force®. When repairing or maintaining a G-Force®, use only Gorbel® recommended parts and materials.

Note: G-Force® shown with Gorbel® Sliding Handle, not Pendant Handle.

1. Read & follow all instruction & warning information on or attached to the G-Force®.
2. Check Wire Rope for improper seating, twisting, kinking, wear or defects before operating.
3. Center G-Force® over the load before lifting a load. Do not end or side load.
4. Avoid swinging of load or load hook when traveling with the G-Force®.
5. Check the coil cord for improper seating, twisting, kinking, wear or defects before operating.
6. Do not over-twist coil cable assembly (>360°). Damage and/or failure could occur.
7. The Operator Present switch should be depressed the entire time the G-Force® is in use.
8. Press Float Mode Button with only the load weight hanging from unit. Applying other force will cause unit to drift.
9. The wire rope should never be more than 20° out of vertical while the G-Force® is in use.
10. Do not bang the G-Force® into end stops repeatedly or at a speed faster than a normal walking pace.
11. Maximum Trolley Saddle for the G-Force® is 12'. See drawing for Trolley Saddle definitions by unit size.
12. Questions about G-Force®?
   Call Gorbel® Customer Service at (800) 821-0086 or your local Gorbel® distributor.
INTRODUCTION

Thank you for choosing a Gorbel® G-Force® BX Intelligent Lifting Device (ILD)** to solve your material handling needs. The innovative design and heavy-duty construction of the G-Force® BX ILD will provide a superior quality product that will offer years of long-term value. A Gorbel® G-Force® BX ILD will provide many years of dependable service by following the installation and maintenance procedures described herein.

** U.S. PATENT NO’S: 5,865,426, & 6,386,513 OTHER PATENTS PENDING

Dimensions contained in this installation manual are for reference only and may differ for your particular application.

Normal safety precautions: These include, but are not limited to:
• Checking for obstructions in crane and hoist travel.

WARNING

Only competent erection personnel familiar with standard fabrication practices should be employed to install the G-Force® ILD because of the necessity of properly interpreting these instructions. Gorbel is not responsible for the quality of workmanship employed in the installation of this hoist according to these instructions. Contact Gorbel, Inc., at 600 Fishers Run, P.O. Box 593, Fishers, New York 14453, 1-585-924-6262, for additional information, if necessary.

WARNING

Equipment described herein is not designed for, and should not be used for, lifting, supporting or transporting humans. Failure to comply with any one of the limitations noted herein can result in serious bodily injury and/or property damage. Check Federal, State and Local regulations for any additional requirements.

WARNING

Prior to installation, consult a qualified structural engineer to determine if your support structure is adequate to support the loadings created during normal operation of the G-Force® ILD.

WARNING


WARNING

Do not field modify the G-Force® BX ILD in any way. Any modification without the written consent of Gorbel, Inc., will void warranty.

WARNING

The unique serial number for this unit can be found on the front cover of this manual and on the ID nameplate sticker attached to the back bottom of the G-Force® ILD Actuator assembly cover. Always have this serial number available during all correspondence regarding your G-Force® BX, ILD, or when ordering repair parts.

WARNING

The Jog Switch buttons are for system maintenance and load testing use only, and should not be manipulated during normal operation of the G-Force® BX ILD. Operation of the Jog Switch buttons during normal operation increases the risk of personal injury to the operator.
CORRECT G-FORCE® INSTALLATION ORIENTATION

150# BX G-Force® with Pendant

300/380# BX G-Force® with Pendant

WARNING
The BX G-Force® was designed and fully life tested in the installation orientation shown above. Any modification to the installation orientation of the BX G-Force® without the written consent from Gorbel, Inc. Engineering will immediately void the warranty. Please contact the factory if a modification to the installation orientation shown above is desired.

G-FORCE® BX ILD MAIN ASSEMBLY COMPONENT DESCRIPTION

Standard Assembly: The G-Force® BX ILD consists of three (3) main assemblies and they are as follows:

1) **Actuator**: The Actuator assembly contains the main lifting power transmission of the G-Force® BX ILD. The drive assembly of the Actuator consists of the ServoMotor with failsafe brake, Gearbox, Main Drum Pulley, and Controls. The Actuator assembly also contains the Upper and Lower Limit Switches. See the Lift Functionality and Controls Interface Feature sections for additional details.

2) **Coil Cord and Wiring Harness Assembly**: The Coil Cord assembly carries the signals from the Handle back to the Controls in the Actuator assembly. The Coil Cord carries signals back to the Controls for lift speed, lift direction, E-Stop, and Float Mode (if equipped).

3) **Handle**: The Handle is the main interface between the operator and the lifting device. Tooling must meet the guidelines set forth by Gorbel, Inc. Improper tooling integration will result in degraded performance and may lead to premature failure of the G-Force® BX ILD. See the Lift Functionality and Controls Interface Feature sections for additional functionality located at the Handle.
LIFT FUNCTIONALITY

**Standard Operation:** The Gorbel® G-Force® BX ILD is a servomotor driven, high speed, material handling device. When the device is in the standard operational mode, the up and down levers command the z-axis direction and speed of the lift (*reference Diagram A*). The mechanical brake is activated when neither of the up or down levers is depressed and will deactivate when one of the levers is depressed. The more the up or down lever are depressed, the faster the servo movement to raise or lower the load.

**Float Mode (System Option):** This mode is initiated by simply depressing the Enable Float Mode button on the face of the pendant (*reference Diagram A*). In this mode, the operator can simply handle the load directly with either an upward or downward force applied to the load. The greater the force applied, the faster the load will move. There is a standard setting in the controls that safely limits the maximum speed of travel in float mode. Depressing one of the up or down levers while in Float Mode will cause the unit to exit Float Mode. While in Float Mode, the load cannot be increased or decreased because this may cause unwanted motion on the unit. Float Mode must be reinitiated each time the weight of the live load is changed.

**WARNING**

When using a pendant handle with the unit in float mode, depressing the up or down lever will move the load as well as cancel float mode. DO NOT HOLD LEVER DOWN unless rapid motion is desired. Cancel float mode with a quick, light press on either lever.

**Emergency Stop Button:** When depressed, the Emergency Stop (E-Stop) button cuts off all power to the Controls, and sets the mechanical brake. The E-Stop button is located on the face of the pendant handle (*reference Diagram A*). The G-Force® cannot operate until the E-Stop has been reset.

![Diagram A. Pendant Handle - E-stop Button, Enable Float Mode Button, Up and Down Levers.](image)
Overload: The servo controller will prevent the lift from moving upward if loaded beyond the maximum capacity of the G-Force® BX ILD. When an overload condition is sensed, the Overload indicator is illuminated and the lift is prevented from moving upward. The lift may be moved down to allow for the safe removal of the load. Cycle the power off and on to reset.

Limit Switches: The G-Force® is equipped with both mechanical Upper and Lower Limit switches, located in the Actuator assembly. When the Upper Limit switch is triggered, the upward motion of the lift stops quickly at a controlled deceleration rate. The controlled deceleration rate guarantees the load cannot come off the hook. When the Upper Limit is triggered, the lift will move down but not up. The lower limit is set so that a minimum of two (2) full wraps of wire rope remain on the drum pulley at all times. When the Lower Limit switch is triggered, the downward motion of the lift stops quickly at a controlled deceleration rate. When the Lower Limit is triggered, the lift will only move up and not down.

Slack Switch: The G-Force® is equipped with a pair of Slack Switches that sense tension in the wire rope and trips when the wire rope develops slack. The switches are located inside the Actuator assembly. When the Slack Switches sense slack in the wire rope, downward movement of the lift is stopped to minimize the amount of wire rope unwound from the drum pulley. When slack in the wire rope is sensed, the lift will only move up but not down.

Remote Mount Handle (System Option): The lifting device is capable of operating with the handle displaced from the wire rope. For example, if an end user has tooling that is too large for the operator to safely reach and operate the handle in the standard position, remote mounting the handle is recommended. The tooling must be mounted (and balanced) on the end of the wire rope, while the handle can be remote mounted. The tooling must be attached to the end of the wire rope with a swivel assembly (supplied by Gorbel, Inc.). Failure to mount the tooling with a swivel assembly can result in premature failure of both the wire rope and the coil cord. The remote mounted handle is linked to the coil cord via extension cables and connectors. If the device is equipped for Float Mode, a load cell assembly is provided that must also be mounted between the tooling and the end of the wire rope. The handle is linked to the load cell via an extension cable and connectors. The end user must supply Gorbel, Inc., with the required length of the extension cables such that they can be safely routed and clamped to the tooling. Always include the distance for bends and turns when providing the extension length.

**WARNING**
The Jog Switch buttons are for system maintenance and load testing use only, and should not be manipulated during normal operation of the G-Force® BX ILD. Operation of the Jog Switch buttons during normal operation increases the risk of personal injury to the operator.
2. **Speed Control Adjustment:** The 10 position Speed Control adjustment switch allows the operator to adjust the speed of the lifting device with a small flathead screwdriver.

3. **Power Up Diagnostic Mode:** When the “E-stop” button is released and power is applied to the lift, the servo motor controller goes into a power up diagnostic mode test. The following are the sections of the diagnostic mode test:

   a) **LED Indicator Test:** The purpose of this test is to verify the five (5) indicator LEDs are functional. When the E-stop button is released, the yellow “Power On” LED comes on immediately indicating the internal 24 volt power is operational. After the servo controller completes a series of self-tests, it turns on the four (4) remaining LEDs for two (2) seconds to simply verify functionality.

   b) **Switch Test:** After completion of the indicator test, a system switch test is started. The purpose of this test is to display the state of the “Slack” switches and “Upper and Lower Limit” switches. During the switch test, the Green “Standard Mode” LED will remain on if the “Upper Limit” switch is triggered (up limit state) and the Blue “Float Mode” LED will remain on if the “Slack” switches are triggered (wire rope slack). Once the operator present switch or jog switch is activated, the servo motor controller exits the power up diagnostic mode and goes into normal operation.

*Note:* The Yellow Power On indicator will remain on during the power up diagnostic mode test.

4. **Power On LED (Yellow):** The “Power On” LED illuminates when the required 220 VAC, single-phase power has been correctly applied to the system and the E-Stop button has been released.

5. **Standard Mode LED (Green):** The “Standard Mode” LED illuminates when all system initialization is complete, thus activating the standard mode of operation.

6. **Capacity Overload LED (Orange):** The “Capacity Overload” LED illuminates when a load or impact load greater than the capacity of the hoist has been detected by the system. When this LED illuminates, the controller will allow the operator to lower the load, but it will inhibit the operator from raising the load prior to “resetting” the system. To clear the overload fault and “reset” the system, cycle the power off and on using the emergency stop button.

7. **Float Mode LED (Blue):** If the unit is equipped with Float Mode (system option), the “Float Mode” enabled LED will illuminate when the Float Mode button is pressed on the hand controller and Float Mode has been initiated.

8. **System Fault LED (Red):** The “System Fault” LED flashes when basic faults have been detected by the control system. If a fault has occurred, the “Standard Mode” or “Float Mode” (if equipped) LEDs will turn off.
<table>
<thead>
<tr>
<th>BX Series</th>
<th>150 lbs.</th>
<th>300 lbs.</th>
<th>380 lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Capacity (Load &amp; Tool)</td>
<td>150 lbs.</td>
<td>300 lbs.</td>
<td>380 lbs.</td>
</tr>
<tr>
<td>Max Lifting Speed Unloaded (feet per minute)</td>
<td>275 fpm</td>
<td>138 fpm</td>
<td>98 fpm</td>
</tr>
<tr>
<td>Max Lifting Speed Fully Loaded (feet per minute)</td>
<td>200 fpm</td>
<td>100 fpm</td>
<td>71 fpm</td>
</tr>
<tr>
<td>Max Float Mode (Option) Lifting Speed (feet per minute)</td>
<td>131 fpm</td>
<td>88 fpm</td>
<td>63 fpm</td>
</tr>
<tr>
<td>Max Lift Stroke</td>
<td>7 ft</td>
<td>7 ft</td>
<td>7 ft</td>
</tr>
<tr>
<td>Primary Lift Voltage</td>
<td>220 VAC (1 Phase) +/- 10%</td>
<td>220 VAC (1 Phase) +/- 10%</td>
<td>220 VAC (1 Phase) +/- 10%</td>
</tr>
<tr>
<td>Amps</td>
<td>5</td>
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</tr>
<tr>
<td>Capacity Overload Safety</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>LED Indicator Lights</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Anti-Recoil</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Failsafe Brake</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Float Mode Capable</td>
<td>Yes (Option)</td>
<td>Yes (Option)</td>
<td>Yes (Option)</td>
</tr>
<tr>
<td>Inertia Management</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Precision Lift Capability</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Drive/Control System</td>
<td>Servo</td>
<td>Servo</td>
<td>Servo</td>
</tr>
<tr>
<td>Speed Adjustment</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Jogging Capability</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Media</td>
<td>Wire Rope</td>
<td>Wire Rope</td>
<td>Wire Rope</td>
</tr>
<tr>
<td>Duty Cycle</td>
<td>H5</td>
<td>H5</td>
<td>H5</td>
</tr>
</tbody>
</table>
INSTALLATION

STEP 1 - UNPACKING THE G-FORCE® BX ILD

TIP: Packing list can be found in plastic pocket attached to shipping box.

1.1 Carefully remove all items from the box.

Diagram 1A. 150# BX series with suspended pendant - shipped components.

Diagram 1B. 300/380# BX series with suspended pendant - shipped components.
1.2 Verify that all components listed on the packing slip are included.

1.3 If any items are missing or were damaged during shipping, please contact Gorbel® Customer Service immediately.
STEP 2 - PRE-ASSEMBLY

2.1 Read entire installation manual before beginning installation of the G-Force® BX ILD.

2.2 Tools and materials typically needed to install/assemble a G-Force® BX ILD are as follows:
   - Hand tools
   - Plastic cable tie straps
   - Ladders/man lifts

2.3 Prior to installing the G-Force® BX ILD, it is a good idea to familiarize yourself with the main components.
   - Reference the following layout drawings:
     - Figure I1, page 58 - 150# BX Suspended Pendant with Float Mode Component Layout
     - Figure I2, page 59 - 150# BX Suspended Pendant without Float Mode Component Layout
     - Figure I3, page 60 - 300/380# BX Suspended Pendant with Float Mode Component Layout
     - Figure I4, page 61 - 300/380# BX Suspended Pendant without Float Mode Component Layout
     - Figure I5, page 62 - Remote Mount Pendant without Float Mode Component Layout
     - Figure I6, page 63 - Remote Mount Pendant with Float Mode Component Layout

STEP 3 - INSTALLING THE ACTUATOR ASSEMBLY

3.1 Verify that the G-Force® BX ILD trolley wheels are correct for the style and capacity that the unit is being installed on. Note: Standard 150# G-Force® BX ILDs come with the wheels pre-assembled to the Actuator Trolley. Standard 300 and 380# G-Force® BX ILDs are supplied with an assembled Actuator Adapter Trolley and two (2) properly sized Hoist Trolleys when being installed in a Gorbel® Bridge system. The customer must provide two (2) Hoist Trolleys when the unit will run in a non-Gorbel® Bridge system. 150# G-Force® BX ILDs can also be supplied with an Actuator Adapter Trolley, similar to that of the 300 and 380# units.

3.2 300 and 380# G-Force® BX ILD: Assemble the Hoist Trolleys to the Actuator Adapter Trolley. Remove the Clevis Pin and flat washers from the Hoist Trolleys. Slide the Trolley legs over the Adapter Trolley and align the holes. Re-assemble the Clevis Pin and washers to the Hoist Trolleys (reference Diagram 3A).

3.3 Remove the end stop from the Bridge and install the G-Force® Actuator into the track. Immediately re-install the end stops. Roll the Actuator Assembly along the full length of the Bridge to assure that the travel is smooth throughout.

STEP 4 - SUSPENDED PENDANT WITHOUT FLOAT MODE INSTALLATION

Note: For Suspended Pendant with Float Mode Installation, go to Step 4A.
For Remote Mount Pendant Installation, with or without Float Mode, go to Step 4B.

4.1 Attach the threaded connector on the suspended pendant to the eye hook on the actuator assembly (reference Diagram 4A).

4.2 Connect the large rectangular connector on the suspended pendant wiring harness to the plug on the control’s interface located on the bottom side of the actuator assembly (reference Diagram 4A).

4.3 Remove the cable clamp, spacer and bolt from the bottom of the actuator assembly (reference Diagram 4A).
4.4 Capture the cord of the suspended pendant wiring harness in the cable clamp, insert the bolt through the cable clamp and spacer, and attach the bolt to the bottom side of the actuator assembly.

4.5 Adjust the cord of the wiring harness so that there is a service loop in the wiring harness and there is no tension in the cord.

**STEP 4A - SUSPENDED PENDANT WITH FLOAT MODE INSTALLATION**

4A.1 Attach the threaded connector on the suspended pendant to the eye hook on the actuator assembly *(reference Diagram 4A, page 13).*

4A.2 Connect the large rectangular connector on the suspended pendant wiring harness to the plug on the control's interface located on the bottom side of the actuator assembly *(reference Diagram 4A, page 13).*

4A.3 Remove the cable clamps, spacers and bolts from the bottom of the actuator assembly *(reference Diagram 4A, page 13).*

4A.4 Capture the cord of the suspended pendant wiring harness (with large rectangular connector) in the cable clamp, insert the bolt through the cable clamp and spacer, and attach the bolt to the bottom side of the actuator assembly.

4A.5 Adjust the cord of the wiring harness so that there is a service loop in the wiring harness and there is no tension in the cord.

4A.6 Remove the cotter pin and clevis pin from the swivel assembly on the coil cord and load cell assembly *(reference Diagram 4B).*

4A.7 Feed the wire rope from the actuator assembly through the center of the coil cord. Slide the looped end of the wire rope assembly into the yoke of the swivel assembly *(reference Diagram 4B).*

**Diagram 4B. Handle to Wire Rope Assembly.**

**Diagram 4C. Coil Cord to Actuator assembly.**
4A.8 Re-insert the clevis and cotter pin capturing the wire rope assembly in the swivel assembly (reference Diagram 4B, page 14).

4A.9 Assemble the coil cord to the cable clamps by capturing the cord in the opening in the clamp (reference Diagram 4C, page 14)

4A.10 Re-assemble the coil cord mounting clamps to the bottom side of the actuator assembly (reference Diagram 4C, page 14).

4A.11 Connect the round connector on the coil cord assembly to the round connector on the suspended wiring harness.

4A.12 Capture the cord of the suspended pendant wiring harness (with round connector) in the cable clamp, insert the bolt through the cable clamp and spacer, and attach the bolt to the bottom side of the actuator assembly.

4A.13 Adjust the cord of the suspended pendant wiring harness (with round connector) so that there is a service loop in the wiring harness and there is no tension in the cord.

4A.14 Assure that the coils of the coil cord are centered around the wire rope when properly installed.

STEP 4B - REMOTE MOUNT HANDLE INSTALLATION
(For Float Mode and Non-Float Mode Units)

4B.1 Attach the wire rope swivel assembly directly to the end tooling.

4B.2 Remove the cotter pin and clevis pin from the swivel assembly (reference Diagram 4B, page 14).

4B.3 Feed the wire rope from the actuator assembly through the center of the remote mount coil cord. Slide the looped end of the wire rope assembly into the yoke of the swivel assembly (reference Diagram 4B, page 14).

4B.4 Re-insert the clevis and cotter pin, capturing the wire rope assembly in the swivel assembly (reference Diagram 4B, page 14).

4B.5 Remove the cable clamps from the bottom of the actuator assembly.

4B.6 Assemble the remote mount coil cord to the cable clamps by capturing the cord in the opening in the clamp (reference Diagram 4C, page 14).

4B.7 Re-assemble the coil cord mounting clamps to the bottom side of the actuator assembly (reference Diagram 4C, page 14).

4B.8 Connect the large rectangular connector on the coil cord to the plug on the controls interface located on the bottom side of the actuator assembly.

4B.9 Assure that the coils of the coil cord are centered around the wire rope when properly installed.

4B.10 Attach the clamp collar bracket to the tooling or attach the pendant handle bracket directly to the tooling.

4B.11 Connect the large round connector on the remote mount pendant wiring harness to the large round connector on the remote mount coil cord. Securely clamp the remote mount pendant wiring harness to the tooling as needed.

4B.12 If the unit is equipped with float mode, connect the small round connector on the remote mount pendant wiring harness to the small round connector on the remote mount coil cord.
STEP 5 - ELECTRICAL POWER CONNECTION

**TIP:** Do not connect to main power until all assembly is complete.

### STANDARD

5.1 Prior to final wiring, inspect the entire system to assure that all connections are seated properly and are without kinks or bends.

5.2 Connect a 220 VAC single-phase power source through a Disconnect Switch (by others) to the festooned power cabling (not provided with G-Force® BX ILD).

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Source power to the BX G-Force® unit is to measure 220 VAC (1 Phase) +/- 10%. Minimum Voltage = 198 VAC. Maximum Voltage Must NOT Exceed 242 VAC. Voltages greater than 242 VAC will result in premature Control System failure.</strong></td>
</tr>
</tbody>
</table>

5.3 Wire the Female Turnlok Power Plug (provided) to the end of the festooned power cable.

5.4 After verifying the Disconnect Switch is turned **OFF**, connect the newly installed receptacle to the Male Plug at the G-Force® BX ILD.

### STEP 6 - AIR CONNECTION (OPTION)

**TIP:** G-Force® BX ILD units (Standard Inline or Remote Mounted) that are ordered with Air power, have a 3/8” ID Nycoil air hose integrated into the full length of the Coil Cord. The Coil Cord is provided with two (2) Male fittings located at both ends of the air hose. Gorbel also provides both mating Female fittings for 3/8” ID air hose.

6.1 Assemble one of the Female fittings (provided) to the end of the input air hose (not provided).

6.2 Assemble the other Female fitting (provided) to the end of the tooling airline (not provided).

6.3 Connect both fittings to the respective ends of the Nycoil air hose in the Coil Cord.

6.4 Release the valve supplying air to the G-Force® BX ILD. Inspect and assure that all connections are properly made and there are no air leaks.

### STEP 7 - INITIAL POWER-UP

7.1 Turn on the Disconnect Switch (by others) to apply power to the G-Force® BX ILD.

7.2 Disengage the Emergency Stop (E-stop) button located on the front face of the handle.

7.3 The system will complete the “Power Up Diagnostic Test” described in the “Controls Interface Features” section of this manual on pages 6 & 7.

7.4 When the “Power Up Diagnostic Test” has been successfully completed, the unit is ready for operation.

7.5 **Standard Operation:** Depress the up and down levers on the handle and run the unit up and down several times (at least 20 times in each direction) to assure that there is no mechanical binding in the lift system or electrical connection issues.

7.6 **Float Mode (if equipped):** Lift up a load greater than 20 lbs. Settle the Load and depress the “Float Mode Enabled” button ***Do not hold onto the part while initiating Float Mode.*** This will give the unit a false reading and cause excessive drift. Grasping the load, run the unit up and down several times (at least 20 times in each direction) to assure proper operation. Float Mode should provide a nice smooth feel.

7.7 Finally, test the operation of any special tooling that may have been integrated to the G-Force® BX ILD.

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gorbel, Inc., does not provide integrated tooling for the G-Force® BX ILD. All tooling related questions should be directed to the tooling manufacturer or supplier.</td>
</tr>
</tbody>
</table>
STEP 8 - ADJUSTING LIFT SPEED

8.1 Take note of the speed of the unit as it is raised and lowered during Step 7. The speed of the G-Force® BX ILD can be adjusted using the 10 position Speed Selector switch located at the Controls Interface back at the bottom face of the actuator assembly.

8.2 Using a small flat-head screwdriver, the position of the switch can be turned to any of the positions that are numbered from 0 to 9. If a slower speed is desired, position the switch to a smaller number (towards 0). If a faster speed is desired, position the switch to a larger number (towards 9).

STEP 9 - FLOAT MODE (OPTION)

9.1 Lift and steady the load.

9.2 Without applying any external forces to the load, press the Float Mode Button for one (1) second. When done correctly, the “Blue” LED light will turn on (the “Yellow” LED will remain on as well).

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>If external forces are applied to the load while Float Mode is being initiated, the G-Force® will calculate a baseline weight that is higher or lower than the actual weight being lifted. When the external force is removed, the load will begin to drift in the opposite direction of the load that was applied.</td>
</tr>
</tbody>
</table>

9.3 The direction and speed of travel is now being controlled by the amount of force that the operator exerts directly onto the load. To move the load down, put vertical pressure on the load in down direction. To move the load up, lift up on the load in the vertical up direction. The higher the force exerted on the load, the faster the unit moves.

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEVER remove the load from the G-Force® while still in Float Mode. The drive will interpret the removal of the load as operator intent to lift the load. Therefore, the unit will begin to drift up. The speed of the unit drift directly correlates to the weight that was removed from the unit. The heavier the weight, the faster the unit will travel.</td>
</tr>
</tbody>
</table>

STEP 10 - FINAL STEPS

**TIP:** Gorbel® Customer Service is available from 7am to 7pm Eastern Time Monday - Thursday and 7am to 5pm Eastern Time Friday.

10.1 Please contact the Gorbel® factory (585-924-6262) of any of the following occur. **DO NOT ATTEMPT TO REPAIR UNIT YOURSELF.**

- Excessive noise
- Unexpected operation
- Change in performance
- Damage or excessive wear to unit components
- Questions about the unit arise

Please do not be limited by these items only.

10.2 Keep Packing List, Installation Manual, Drawings, and any other inserts filed together in a safe place.
The G-Force® ILD has extensive diagnostic capability. The “Red” System Fault LED flashes when basic faults have been detected by the control system. If a fault has occurred, the Standard Mode Operating or Float Mode LEDs will go off.

The red System Fault LED flashes a simple code when a fault has occurred. The sequence of flashes indicates the type of fault. The sequence consists of a number of short flashes followed by a long pause. The number of short flashes is the key to determining the fault code. For example, three (3) short flashes followed by a long pause indicates fault code #3. The sequence continually repeats until the fault is reset. The Fault Codes are listed in the chart below.

<table>
<thead>
<tr>
<th>Fault Code</th>
<th>Failure</th>
<th>Possible Causes</th>
</tr>
</thead>
</table>
| 2          | DC Bus Under Voltage     | 1. Low AC line in.  
                        | 2. Transformer feeding AC in on the MLD is undersized for the load.            |
| 3          | DC Bus Over Voltage      | 1. High AC line in.  
                        | 2. Regen circuit is not operating correctly.                                   |
|            |                          | 3. Regen resistor not connected correctly or has failed.                       |
| 4          | IGBT Fault               | 1. Too much weight being lifted by the unit (applies if weight limit set greater than 185 pounds on a 150 pound unit).  
                        | 2. Loss of an internal power supply voltage.                                  |
|            |                          | 3. PWM logic error.                                                           |
|            |                          | 4. Over current detected through IGBT.                                        |
| 5          | IGBT Over Temperature    | 1. IGBT is greater than 85 degrees C.                                          |
| 6          | Over Current             | 1. Over current detected through the current sensor.                           |
|            |                          | 2. Too much weight being lifted by the unit (applies if weight limit set greater than 185 pounds on a 150 pound unit).  
                        | 3. Wire Rope is bound.                                                       |
|            |                          | 4. The motor is wired incorrectly.                                            |
|            |                          | 5. IGBT failure (applies if code will not reset with the cycling of power).    |
| 7          | Motor Over Temperature   | 1. Motor has exceeded its upper temperature limit.                             |
| 8          | Safety Relay Failure     | 1. Relay timing closing the motor brake and opening the motor windings does not meet specified timing requirements. |
| 9          | Unknown Source Reset     | 1. CPU was reset, but not by power down or via the JTAG programming port.     |
| 10         | Missing Clock Caused Reset| 1. 16 Mhz clock stopped.                                                      |
| 11         | Watchdog Timer Caused Reset| 1. The CPU has stopped running code feeding watchdog timer.                     |
| 12         | XTAL Oscillator Startup Error| 1. The external 16 Mhz oscillator did not start.                             |
| 13         | Unexpected Hardware Configuration| 1. Mode switch does not match jumper or software configuration.                |
|            |                          | 2. Power interruption during operation.                                        |

Note: If any of the above listed problems persist, contact Gorbel® Customer Service.
WIRE ROPE INSPECTION

1) Frequent Inspection

The operator or other designated person should visually inspect all ropes at the start of each shift. These visual observations should be concerned with discovering gross damage, such as listed below, which may be an immediate hazard:

(a) distortion of the rope such as kinking, crushing, unstranding, birdcaging, main strand displacement, or core protrusion;
(b) general corrosion;
(c) broken or cut strands;
(d) number, distribution, and type of visible broken wires. [See next section on rope replacement]

When such damage is discovered, the rope shall either be removed from service or given an inspection as detailed in the next section.

2) Periodic Inspection

The inspection frequency shall be determined by a qualified person and shall be based on such factors as expected rope life as determined by experience on the particular installation or similar installations; severity of environment; percentage of capacity lifts; frequency rates of operation; and exposure to shock loads. Inspections need not be at equal calendar intervals and should be more frequent as the rope approaches the end of its useful life.

A designated person shall perform periodic inspections. This inspection shall cover the entire length of rope. The individual outer wires in the strands of the rope shall be visible to this person during the inspection. Any deterioration resulting in appreciable loss of original strength, such as described below, shall be noted, and determination shall be made as to whether further use of the rope would constitute a hazard:

(a) points listed in previous section on frequent inspection;
(b) reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires;
(c) severely corroded or broken wires at end connections;
(d) severely corroded, cracked, bent, worn, or improperly applied end connections.

Special care should be taken when inspection sections of rapid deterioration, such as the following:

(a) sections in contact with saddles, equalizer sheaves, or other sheaves where rope travel is limited;
(b) sections of rope at or near terminal ends where corroded or broken wires may protrude;
(c) sections subject to reverse bends;
(d) sections of ropes that are normally hidden during visual inspection, such as parts passing over sheaves.

WIRE ROPE MAINTENANCE

1) Rope should be stored to prevent damage or deterioration.

2) Rope shall be unreeled or uncoiled in a manner to avoid kinking of or inducing a twist in the rope.

3) Before cutting rope, means shall be used to prevent unlaying of the strands.

4) During installation, care should be observed to avoid dragging of the rope in dirt or around objects that will scrape, nick, crush, or induce sharp bends.
5) Rope should be maintained in a well-lubricated condition. Gorbel recommends using Chain and Cable Penetrating oil for lubrication. Lubricant applied as part of a maintenance program shall be compatible with the original lubricant. Lubricant applied shall be of the type that does not hinder visual inspection. Immediately after inspection, lubricant shall be applied before rope is returned to service. Those sections of rope that are located over sheaves or otherwise hidden during inspection and maintenance procedures require special attention when lubricating rope. The object of rope lubrication is to reduce internal friction and to prevent corrosion.

### WIRE ROPE REPLACEMENT CRITERIA

1) No precise rules can be given for determination of the exact time for rope replacement, since many factors are involved. Once a rope reaches any one of the specified removal criteria, it may be allowed to operate to the end of the work shift, based on the judgement of a qualified person. The rope shall be replaced after that work shift, at the end of the day, or at the latest time prior to the equipment being used by the next work shift.

2) Removal criteria for the rope replacement shall be as follows:

   (a) in running ropes, 12 randomly distributed broken wires in one lay or four broken wires in one strand in one lay (reference Diagram E below);
   (b) one outer wire broken at the contact point with the core of the rope, which has worked its way out of the rope structure and protrudes or loops out from the rope structure;
   (c) wear of one-third the original diameter of outside individual wires;
   (d) kinking, crushing, birdcaging, or any other damage resulting in distortion of the rope structure;
   (e) evidence of heat damage from any cause;
   (f) reductions from nominal diameter greater than those shown below:

<table>
<thead>
<tr>
<th>Rope Diameter</th>
<th>Maximum Allowable Reduction From Nominal Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 5/16 in. (8 mm)</td>
<td>1/64 in. (0.4 mm)</td>
</tr>
</tbody>
</table>

3) Broken wire removal criteria applies to wire ropes operating on steel sheaves and drums. However, results of internal testing have shown that rope replacement follows the same criteria regardless of sheave or drum material.

4) Attention shall be given to end connections. Upon development of two broken wires adjacent to a socketed end connection, the rope should be resocketed or replaced. Resocketing shall not be attempted if the resulting rope length will be insufficient for proper operation.

5) Replacement rope and connections shall have strength rating at least as great as the original rope and connections furnished by the hoist manufacturer. A rope manufacturer, the hoist manufacturer, or a qualified person shall specify any deviation from the original size, grade, or construction.

![Diagram E. Wire Rope Composition Diagram.](image)
WIRE ROPE REPLACEMENT INSTRUCTIONS

Note: All referenced drawings below are for a 150# unit. The procedure remains the same regardless of capacity.

1) Depress the Emergency Stop (E-Stop) button on the Handle. Disconnect power from the unit.

2) Remove the Covers from the Actuator assembly.
   a) First, remove the Controls side Cover (Item #2, Figure A14, page 32) from the Actuator assembly. To remove this Cover you must first unscrew and remove the Coil Cord Plug from the Controls Interface. Remove the Coil Cord mounting Clamp (Item #11, Figure A14, page 32). Remove the three (3) mounting screws (Item #10, Figure A14, page 32) from the Controls side Cover only. Finally, remove the Cover mounting bolt (Item #7, Figure A14, page 32) at the Actuator Frame. Slide the Cover off of the Actuator assembly.
   b) Remove the remaining side Cover (Item #3, Figure A14, page 32) from the Actuator assembly. Remove the Coil Cord mounting Clamp (Item #11, Figure A14, page 32). Remove the Upper Limit Switch Disc (Item #5, Figure A14, page 32). Finally, remove the Cover mounting bolt (Item #7, Figure A14, page 32) at the Actuator Frame. Slide the Cover off of the Actuator.

3) Remove three (3) of the Heatsink mounting bolts (Item #8, Figure A9, page 29), leaving the lower left bolt in place. Loosen, but do not remove, the lower left mounting bolt and rotate the Heatsink down towards the floor. This will support the Heatsink while wire rope replacement is being performed.

4) Remove the Nylon Drum Cover (Item #2, Figure A8, page 28) from the Actuator. Remove the six (6) mounting bolts and lockwashers (Item #s: 3 & 4, Figure A8, page 28) and slide the Drum Cover off of the Main Drum Pulley.

5) Re-attach the large rectangular plug to the Controls Interface and Power to the unit.

6) Release the Emergency Stop (E-Stop) button on the Handle. At the Controls Interface, jog the unit down until the remaining Wire Rope has been payed off of the Main Drum Pulley.

7) Depress the Emergency Stop (E-Stop) button on the Handle and disconnect Power to the unit.

8) Remove the cotter and clevis pins from the Swivel assembly. Pull the damaged Wire Rope out of the Swivel assembly.

9) Remove the Upper Limit Donut from the broken wire rope assembly.

10) Remove the Wire Rope termination cover (Item #3, Figure A6, page 27) by removing the mounting bolts (Item #7, Figure A6, page 27) from the Main Drum Pulley.

11) Remove the terminated end of the Wire Rope from the Main Drum Pulley. Do so by simply lifting the terminated end out of the groove in the Drum Pulley. Pull the damaged wire rope completely out of the Actuator assembly.

12) Unless otherwise instructed, discard the damaged wire rope.

13) Remove the one (1) Extension Spring (Item #5, Figure A5, page 26) from the Heatsink side of the Actuator Frame by unscrewing the shoulder mounting bolt (Item #9, Figure A7, page 28) attached to the Idler Guide Plate (Item #3, Figure A7, page 28).

14) Remove the two (2) Snap Rings (Item #8, Figure A7, page 28) from the Idler Pulley Shafts (Item #4, Figure A7, page 28) and remove the Idler Pulley Guide Plate (Item #3, Figure A7, page 28).

15) Unscrew the TOP Idler Pulley Shaft (Item #4, Figure A7, page 28) only, using a 5/16” open-end wrench.

TIP: Wire rope replacement is to be performed by qualified maintenance personnel only.
16) Feed the new wire rope assembly, Stop Sleeve terminated end first, through the following path:
   a) Through the Nylon Insert (Item #2, Figure A1, page 24) at the bottom of the Actuator Frame.
   b) Over the top of the Idler Pulley going counter-clockwise.
   c) Clockwise around the Main Drum Pulley (Item #2, Figure A6, page 27). Terminate the wire rope into the side groove and opening located at the front side of the Main Drum Pulley.
   d) Wind the wire rope on the Main Drum Pulley until the wire rope is properly seated into all of the grooves up to and including the one that the Pulley Guide Block (Item #1, Figure A4, page 25) is located in.

   WARNING
   ALL slack must be removed from the wire rope and the wire rope must exit the Drum in the groove that contains the Pulley Guide Block in order to function correctly.

   e) Reconfirm that the wire rope exits the drum in the same groove that contains the Pulley Guide Block, and that all slack has been removed from the wire rope.
   f) Replace the wire rope termination cover (Item #3, Figure A6, page 27) on the Main Drum Pulley.

17) Screw the top Idler Pulley Shaft (Item #4, Figure A7, page 28) back into the Threaded Hole Guide Plate (Item #2, Figure A7, page 28) located on the backside of the Actuator Frame assembly. Tighten using a 5/16” open-ended wrench.

18) Re-assemble the Idler Guide Plate (Item #3, Figure A7, page 28) to the Idler Pulley Shafts (Item #4, Figure A7, page 28) and replace the two (2) Snap Rings (Item #8, Figure A7, page 28).

19) Re-assemble the Extension Spring (Item #5, Figure A5, page 26) to the Idler Guide Plate (Item #3, Figure A7, page 28), by securing the Shoulder bolt (Item #9, Figure A7, page 28) in place.

20) Attach the Upper Limit Donut from Step 10 to the new wire rope assembly.

21) Re-attach the Swivel assembly to the new wire rope assembly.

22) Plug the Coil Cord Connector into the Controls Interface and reconnect power to the unit.

23) Release the Emergency Stop button on the Handle. Run the unit up and down several times to assure proper operation.

24) Depress the Emergency Stop button on the Handle and disconnect the power.

25) Assemble the Nylon Drum Cover (Item #2, Figure A8, page 28) over the Main Drum Pulley.

26) Properly re-assemble the Heatsink (Item #2, Figure A9, page 29) to the Actuator Frame.

27) Replace the Covers on the Actuator assembly.
   a) Re-assemble the side Cover (Item #3, Figure A14, page 32) to the Actuator assembly. Slide the Cover onto the Actuator assembly. Re-assemble the Cover mounting bolt (Item #7, Figure A14, page 32) at the Actuator Frame. Re-assemble the Upper Limit Switch Disc (Item #5, Figure A14, page 32). Re-assemble the Coil Cord mounting Clamp (Item #11, Figure A14, page 32).
   b) Now, re-assemble the Controls side Cover (Item #2, Figure A14, page 32) to the Actuator assembly. Slide the Cover onto the Actuator assembly. Slide the Power Cord Grommet into the slotted opening at the back face of the Cover. Re-assemble the Cover mounting bolt (Item #7, Figure A14, page 32) at the Actuator Frame. Re-assemble the Coil Cord mounting Clamp (Item #11, Figure A14, page 32). Re-assemble the three (3) mounting screws (Item #10, Figure A14, page 32) to the Controls side Cover. Re-assemble the Coil Cord Plug to the Controls Interface.
29) Reconnect power to the unit.

30) Release the Emergency Stop button on the Handle. Run the unit up and down several times to assure proper operation.

31) Continue normal operation.
Figure A1 (bottom) & Figure A2 (top). 150# BX Actuator Assembly.
Figure A5. 150# BX Actuator Assembly.
### 150# BX ACTUATOR ASSEMBLY

#### FIGURE A6

<table>
<thead>
<tr>
<th>#</th>
<th>QTY</th>
<th>P/N</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>REF. ONLY</td>
<td>ACTUATOR ASSEMBLY</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>77301</td>
<td>DRUM PULLEY, 3/16&quot; DIAMETER WIRE ROPE</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>77301**</td>
<td>TERMINATION COVER, (SUPPLIED WITH DRUM)</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>77315</td>
<td>WIRE ROPE ASSEMBLY, 3/16&quot;</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>06329</td>
<td>HHCS, 1/4&quot;-20 x 2-1/2&quot; LG, CR 5, ZNPL</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>02097</td>
<td>LOCK WASHER, 1/4&quot;, ZNPL</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>02149</td>
<td>HHCS, 1/4&quot;-20 x 3/4&quot; LG, CR 5, ZNPL</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>77964</td>
<td>TERMINAL RING, 1/4&quot; STUD, 14-18 AWG</td>
</tr>
<tr>
<td>9</td>
<td>3</td>
<td>77986</td>
<td>TINNED COPPER FLAT BRADING, 3/16&quot; WIRE</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>77550</td>
<td>150 LB GO BUSHING RETAINER</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>00195</td>
<td>LOCK WASHER, MS, ZNPL</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>00269</td>
<td>SHCS, MS x 1.25 MM PITCH x 30 MM LG</td>
</tr>
</tbody>
</table>

#### NOTES:

1) TERMINATE THE BRAIDED GROUND CABLE TO THE BOLT SHOWN. TIN BRAIDED STRAP IS TO LAY OVER THE WIRE ROPE ENTRANCE GROOVE PRIOR TO WIRE ROPE ASSEMBLY.
NOTE: THIS DRAWING APPLIES TO SUSPENDED PENDANT UNITS ONLY

<table>
<thead>
<tr>
<th>#</th>
<th>Qty</th>
<th>P/N</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>90000</td>
<td>BX G-FORCE PENDANT BRACKET</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>90051</td>
<td>CYLINDER</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>90777</td>
<td>NYLOCK NUT 1/4&quot;-20 ZNPL</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>01670</td>
<td>HINGE 1/4&quot;-20 X 1&quot; ZNPL</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>00097</td>
<td>1/4&quot; WEDGE WASHER</td>
</tr>
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150# BX ACTUATOR ASSEMBLY

Figure A13. 150# BX Actuator Assembly.
Figure A15. 150# BX Actuator Assembly.
Figure B1 (bottom) & Figure B2 (top). 300/380# BX Actuator Assembly.
Figure B3 (bottom) & Figure B4 (top). 300/380# BX Actuator Assembly.

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<td>77556</td>
<td>LOWER LIMIT SWITCH BRACKET</td>
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<tr>
<td>3</td>
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<td>77084</td>
<td>LIMIT SWITCH, ROLLER ARM ACTUATED, FORM C</td>
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<tr>
<td>4</td>
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<td>70023</td>
<td>SLRHI, #4-40 X 3/4&quot; LG, ZNPL</td>
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<td>4</td>
<td>70024</td>
<td>HEXNUT, #4-40, ZNPL</td>
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<tr>
<td>6</td>
<td>2</td>
<td>00355</td>
<td>SHCS, #4-24 X 3/8&quot; LG</td>
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<tr>
<td>7</td>
<td>2</td>
<td>01049</td>
<td>LOCKWASHER, #10, ZNPL</td>
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# | QTY | P/N:  | DESCRIPTION |
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<td>1</td>
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<td>GUIDE PLATE, TAPPED HOLES</td>
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<tr>
<td>3</td>
<td>1</td>
<td>77554</td>
<td>GUIDE PLATE, COUNTERSUNK HOLES</td>
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<tr>
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<td>77552</td>
<td>SPACER BLOCK</td>
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<td>00755</td>
<td>FHCS, #10-24 X 1-3/4&quot; LG</td>
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Figure B5. 300/380# BX Actuator Assembly.
300/380# BX ACTUATOR ASSEMBLY

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<td>BUSH PULLEY, 3/16&quot; DIAMETER WIRE ROPE</td>
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<td>77201**</td>
<td>TERMINATION COVER, (SUPPLIED WITH GRUM)</td>
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<td>1</td>
<td>77315</td>
<td>WIRE ROPE ASSEMBLY, 3/16&quot;</td>
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<td>5</td>
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<td>06129</td>
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</tr>
<tr>
<td>6</td>
<td>6</td>
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<td>LOCK WASHER, 1/4&quot;, ZNPL</td>
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<tr>
<td>7</td>
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<td>02146</td>
<td>HHCS, 1/4&quot;-20X 3/4&quot; LG, GR-5, ZNPL</td>
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<tr>
<td>8</td>
<td>1</td>
<td>77964</td>
<td>TERMINAL RING, 1/4&quot; STUD, 14-15 AWG</td>
</tr>
<tr>
<td>9</td>
<td>3&quot;</td>
<td>77966</td>
<td>TINNED COPPER FLAT BRAIDING, 3/16&quot; WIRE</td>
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<tr>
<td>10</td>
<td>1</td>
<td>77531</td>
<td>300 LB GO BUSHING RETAINER</td>
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<tr>
<td>11</td>
<td>1</td>
<td>06204</td>
<td>LOCK WASHER, M10, ZNPL</td>
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<tr>
<td>12</td>
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<td>06210</td>
<td>SHCS, M10 X 1.5 VM PITCH X 30 MM LG</td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>01220</td>
<td>1/4&quot; FLAT WASHER, ZNPL</td>
</tr>
</tbody>
</table>

NOTES:

1) TERMINATE THE BRAIDED GROUND CABLE TO THE BOLT SHOWN. TIN BRAIDED STRAP IS TO LAY OVER THE WIRE ROPE ENTRANCE GROOVE PRIOR TO WIRE ROPE ASSEMBLY.
Figure B7 (bottom) & Figure B8 (top).

300/380# BX Actuator Assembly.

**NOTE**: CONNECT LOOSE END OF EXTENSION SPRINGS (2) TO THE SHOULDER BOLTS DURING INSTALLATION.

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<td>ACTUATOR ASSEMBLY</td>
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<tr>
<td>2</td>
<td>1</td>
<td>77561</td>
<td>THREAD E HOLE GUIDE PLATE</td>
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<tr>
<td>3</td>
<td>1</td>
<td>77557</td>
<td>IDLER GUIDE PLATE</td>
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<tr>
<td>4</td>
<td>2</td>
<td>77560</td>
<td>THREAD E IDLER SHAFT</td>
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<td>1</td>
<td>77559</td>
<td>OFFSET IDLER PULLEY</td>
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<tr>
<td>6</td>
<td>1</td>
<td>73382</td>
<td>BEARING, LINEAR, SELF-LUBRICATING</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>26011.25</td>
<td>SNAP RING, EXTERNAL, 7/8&quot; ID</td>
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<tr>
<td>8</td>
<td>2</td>
<td>77571</td>
<td>SNAP RING, EXTERNAL, 412&quot; G</td>
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<tr>
<td>9</td>
<td>2</td>
<td>32493</td>
<td>SHOULD BOLT, 1/4&quot; SHOULDER X 1/4&quot; LD</td>
</tr>
</tbody>
</table>

---

300/380# BX ACTUATOR ASSEMBLY Figure B7.

300/380# BX ACTUATOR ASSEMBLY Figure B8.
Figure B9 (bottom) & Figure B10 (top). 300/380# BX Actuator Assembly.
Figure B11 (bottom) & Figure B12 (top) - 300/380# BX Actuator Assembly

<table>
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<td>72190</td>
<td>CONTROLS ASSEMBLY, MCG-114</td>
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<td>73364</td>
<td>WASHER, VIBRATION DAMPING, 1/4&quot; ID</td>
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<tr>
<td>4</td>
<td>3</td>
<td>00177</td>
<td>NY LOCK NUT, 1/4&quot;-20, ZNPL</td>
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300/380# BX ACTUATOR ASSEMBLY FIGURE B11

<table>
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<td>ACTUATOR ASSEMBLY</td>
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<td>21155</td>
<td>POWER GEAR ASSEMBLY, G-FORCE</td>
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<tr>
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<td>1</td>
<td>72960</td>
<td>CONNECTION, MALE, HAM, 3 HOLE</td>
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<tr>
<td>4</td>
<td>1</td>
<td>27000</td>
<td>ACTUATOR TAG MATRIX SHEETER</td>
</tr>
</tbody>
</table>

300/380# BX ACTUATOR ASSEMBLY FIGURE B12

NOTES:
1) REMOVE THE HARDWARE ONE SIDE AT A TIME. RE-ASSEMBLE THE HARDWARE THROUGH THE RUBBER CUSHIONED STEEL LOOP STRAPS (AS SHOWN).
2) ROUTE CABLE AS SHOWN.
NOTE: THIS DRAWING APPLIES TO SUSPENDED PENDANT UNITS ONLY

<table>
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<tr>
<td>1</td>
<td>91060</td>
<td>BX G-Force Pendant Base Bracket</td>
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<tr>
<td>1</td>
<td>70151</td>
<td>Screws</td>
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<tr>
<td>3</td>
<td>20177</td>
<td>Nylock Nut 1/4&quot;-20 ZnPl</td>
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<tr>
<td>4</td>
<td>01070</td>
<td>HCS 1/4&quot;-20 x 1&quot; ZnPl</td>
</tr>
<tr>
<td>2</td>
<td>03597</td>
<td>1/4&quot; Lockwasher</td>
</tr>
</tbody>
</table>

Figure B13: 300/380# BX Actuator Assembly
Figure B14. 300/380# BX Actuator Assembly.
Figure B15. 300/380# BX Actuator Assembly.
Figure C1. Pendant Handle Assembly.
**NOTES:**
1. CONNECT RED LEADS TO FLOAT BUTTON
   CONNECT BLACK LEADS TO E-STOP BUTTON

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<td>G-FORCE PENDANT HOUSING ASSEMBLY</td>
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<tr>
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<td>2</td>
<td>85010</td>
<td>SHCS BUTTON HEAD 6/32 X 5/8&quot; LONG, ZNPL</td>
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<tr>
<td>3</td>
<td>1</td>
<td>85014</td>
<td>G-FORCE PENDANT CONNECTOR PC BOARD</td>
</tr>
<tr>
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<td>85012</td>
<td>6/32 X 1/2&quot; LONG STAND OFF</td>
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<tr>
<td>5</td>
<td>1</td>
<td>85013</td>
<td>G-FORCE PENDANT MAIN PC BOARD</td>
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<td>6</td>
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<td>85002</td>
<td>PENDANT HOUSING REAR COVER</td>
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<td>7</td>
<td>5</td>
<td>85009</td>
<td>SHCS BUTTON HEAD 6-32 X 3/8&quot;, ZNPL</td>
</tr>
</tbody>
</table>

**PENDANT HANDLE ASSEMBLY**

**FIGURE C2.**
Figure E1. Suspended Mount Pendant with Float Mode.

1. **WARNING:**COPYRIGHT AND TRADEMARK NOTICE: All rights reserved. Gorbel, Inc. and trade name Gorbel shall be used only with the express written consent of Gorbel, Inc. Gorbel, Inc. and Gorbel are registered trademarks of Gorbel, Inc. Patents pending.

**Precautions:***

1. **PRE-SOLDER ALL CONDUCTOR LEADS INTENDED FOR SCREW CONNECTOR TERMINATION.**
2. **APPLY HEAT SHRINK TUBING TO ALL EXPOSED CONDUCTORS, SHEATHS AND PIPES.**
3. **CONTINUITY TEST FINISHED ASSEMBLY.**
4. **ATTACH (4) PERMANENT, NON-METALLIC LABELS (ITEM 17) IDENTIFYING CABLE ASSEMBLY WITH GORBEL PART NUMBER AND REVISION LEVEL.**

**SUSPENDED MOUNT PENDANT CABLE WITH FLOAT MODE**

**PART #89106**

**FIGURE E1.**
Figure E2. Suspended Mount Pendant without Float Mode.
Figure E3: Coil Cord Assembly - Suspended Mount Pendant with Float Mode

1. **Figure E3.**
   - **Coil Cord Assembly - Suspended Mount Pendant with Float Mode.**
   - **10/04-Rev. K**

---

**FOR USE:**

1. **For coil, pin 5 not required.**
2. **Cover with heat shrink tubing only.**
3. **Prepare all conductor leads for screwed connector termination.**
4. **Apply heat shrink tubing to all exposed conductors, shields, and strands.**
5. **Continuity test finisher assembly.**
6. **Attach (2) permanent, non-metallic labels (item 5) identifying cable assembly with GORBEL part number and revision level.**

---

**Cut coil cable just after knot before assembling 90 degree connector.**

---

**Cut coil cable leaving approximately 3 inches before assembling straight connector.**

---

**COIL CORD FOR SUSPENDED MOUNT PENDANT WITH FLOAT MODE**

**PART #89103**

---

**FIGURE E3.**
Figure E4. Remote Mount Coil Cord Standard - Float Mode.
Figure E5. Air Remote Mount Coil Cord Standard - Float Mode.
REMOTE MOUNT PENDANT WITH FLOAT MODE
PART #89108

1. ATTACH (4) PERMANENT, NON-METALLIC LABELS (ITEM 11) IDENTIFYING CABLE ASSEMBLY WITH GORBEL PART NUMBER AND REVISION LEVEL.
2. CONTINUITY TEST FINISHED ASSEMBLY.
3. APPLY HEAT SHRINK TUBING TO ALL EXPOSED CONDUCTORS, SHIELDS AND DRAINS.
4. PRE-SOLDER ALL CONDUCTOR LEADS INTENDED FOR SCREW CONNECTOR TERMINATION.

Figure E6. Remote Mount Pendant with Float Mode.
Figure E7. Remote Mount Pendant without Float Mode.

ITEM | GORBEL P/N | DESCRIPTION | QTY
--- | --- | --- | ---
1 | N26950 | CONNECTOR, 8-PIN SOCKET, 8-POS, SOLDER | 1
2 | 77153 | CONNECTOR, CIRCULAR PIN, 8-POS, SOLDER | 1
3 | 77154 | CABLE, 24 AWG, 8 CONDUCTORS, SHELTER | FT
4 | 75952 | SERRAFL, TYPE SU-72, THREAD P13, GRY | 1
5 | 59907 | COVER, G-FORCE PENDANT CONNECTOR | 1
6 | 59016 | G-FORCE PENDANT TEST GAUGE | 1
7 | 66156 | SCREWS 1/4-20 x 3/4", ZNL | 2
5 | -- | LABEL | 2

1. APPLY HEAT SHRINK TUBE TO ALL EXPOSED CONDUCTORS, SHIELDS AND BARES.
2. CONTINUITY TEST FINISHED ASSEMBLY.
3. ATTACH (2) PERMANENT, NON-METALLIC LABELS (ITEM 9) IDENTIFYING CABLE ASSEMBLY WITH GORBEL PART NUMBER AND REVISION LEVEL.
Figure F1. BX Controls Schematic Standard - Float Mode.
Figure G1. BX G-Force® 150# with Suspended Pendant Overall Dimensions.
Figure G2. BX G-Force® 300/380®# with Suspended Pendant Overall Dimensions.

NOTES:
1) DIMENSIONS ARE FOR REFERENCE ONLY AND ARE SUBJECT TO CHANGE AT ANY TIME WITHOUT NOTIFICATION.
2) TROLLEY DIMENSIONS ARE FOR CORBEL TRACK PROFILES ONLY.
3) DO NOT SCALE FROM THIS DRAWING.

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<td>8 7/16</td>
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<td>A500</td>
<td>4 3/16</td>
<td>8 7/16</td>
</tr>
<tr>
<td>A1000</td>
<td>5</td>
<td>9 5/8</td>
</tr>
<tr>
<td>A2000</td>
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<td>9 5/8</td>
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<td>SS500</td>
<td>4 3/16</td>
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<td>S1000</td>
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<td>S4000</td>
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<td>10 1/16</td>
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SEE DIMENSIONAL CHART (AT RIGHT)
Figure H1. Pendant Handle Detail Dimensions.
Figure I1. 150# Suspended Pendant with Float Mode Component Layout.
Figure I2. 150# Suspended Pendant without Float Mode Component Layout.
Figure 13. 300/380# Suspended Pendant with Float Mode Component Layout.
Figure 14. 300/380# Suspended Pendant without Float Mode Component Layout.
Figure I5. Remote Mount Pendant without Float Mode Component Layout.
**LOCKING NUT**

LOCK SWIVEL ASSEMBLY TO LOAD CELL. NUTS MUST BE PERIODICALLY INSPECTED TO ASSURE ENGAGEMENT. SEE "INSPECTION AND MAINTENANCE" SCHEDULE AT END OF MANUAL FOR INSPECTION FREQUENCY.

**TOOLING SHOWN IS FOR REFERENCE ONLY. GORBEL INC. IS NOT A TOOLING PROVIDER.**

FIGURE 16.
REMOTE MOUNT PENDANT WITH FLOAT MODE COMPONENT LAYOUT

**CAPACITY:**

**MAXIMUM**

lbs. 150

Figure 16. Remote Mounted Pendant with Float Mode Component Layout.
## RECOMMENDED SPARE PARTS LIST

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<td>1</td>
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<td>77315</td>
<td>Wire Rope Replacement Assembly, 150, 300, &amp; 380#</td>
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<tr>
<td>4</td>
<td>73099</td>
<td>Idler Pulley Guide Block, 150, 300, &amp; 380#</td>
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<td>5</td>
<td>75354</td>
<td>Upper Limit Switch, 150, 300, &amp; 380#</td>
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<td>6</td>
<td>77084</td>
<td>Lower Limit/Slack Switch, 150, 300, &amp; 380#</td>
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<td>77559</td>
<td>Offset Idler Pulley, 150, 300, &amp; 380#</td>
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<td>8</td>
<td>72190</td>
<td>Controls Assembly, MLD-114</td>
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<td>9</td>
<td>78010</td>
<td>BX G-Force® Universal Miscellaneous Hardware Kit</td>
<td>1</td>
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</tbody>
</table>

Contact Gorbel® Customer Service for Spare Parts pricing and availability.
LIMITED WARRANTY

It is agreed that the equipment purchased hereunder is subject to the following LIMITED warranty and no other. Gorbel Incorporated (“Gorbel”) warrants the manual push-pull Work Station Cranes, Jib Crane, and Gantry Crane products to be free from defects in material or workmanship for a period of five years or 10,000 hours use from date of shipment. Gorbel warrants the Motorized Work Station Cranes and Jib Crane products to be free from defects in material or workmanship for a period of two years or 4,000 hours use from the date of shipment. Gorbel warrants the G-Force® and Easy Arm™ products to be free from defects in material or workmanship for a period of one year or 2,000 hours use from the date of shipment. This warranty does not cover Gantry Crane wheels. This warranty shall not cover failure or defective operation caused by operation in excess of recommended capacities, misuses, negligence or accident, and alteration or repair not authorized by Gorbel. No system shall be field modified after manufacture without the written authorization of Gorbel, Inc. Any field modification made to the system without the written authorization of Gorbel, Inc. shall void Gorbel’s warranty obligation. OTHER THAN AS SET FORTH HEREIN, NO OTHER EXPRESS WARRANTIES, AND NO IMPLIED WARRANTIES, ORAL OR WRITTEN, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE MADE BY GORBEL WITH RESPECT TO ITS PRODUCTS AND ALL SUCH WARRANTIES ARE HEREBY SPECIFICALLY DISCLAIMED. GORBEL SHALL NOT BE LIABLE UNDER ANY CIRCUMSTANCES FOR ANY INCIDENTAL, SPECIAL AND/OR CONSEQUENTIAL DAMAGES WHATSOEVER, WHETHER OR NOT FORESEEABLE, INCLUDING BUT NOT LIMITED TO DAMAGES FOR LOST PROFITS AND ALL SUCH INCIDENTAL, SPECIAL AND/OR CONSEQUENTIAL DAMAGES ARE HEREBY ALSO SPECIFICALLY DISCLAIMED. Gorbel’s obligation and Purchaser’s or end user’s sole remedy under this warranty is limited to the replacement or repair of Gorbel’s products at the factory, or at the discretion of Gorbel, at a location designated by Gorbel. Purchaser or end user shall be solely responsible for all freight and transportation costs incurred in connection with any warranty work provided by Gorbel hereunder. Gorbel will not be liable for any loss, injury or damage to persons or property, nor for damages of any kind resulting from failure or defective operation of any materials or equipment furnished hereunder. Components and accessories not manufactured by Gorbel are not included in this warranty. Purchaser’s or end user’s remedy for components and accessories not manufactured by Gorbel is limited to and determined by the terms and conditions of the warranty provided by the respective manufacturers of such components and accessories.

A) DISCLAIMER OF IMPLIED WARRANTY OF MERCHANTABILITY

Gorbel and Purchaser agree that the implied warranty of merchantability is excluded from this transaction and shall not apply to the goods involved in this transaction.

B) DISCLAIMER OF IMPLIED WARRANTY OF FITNESS FOR PARTICULAR PURPOSE

Gorbel and Purchaser agree that the implied warranty of fitness for particular purpose is excluded from this transaction and shall not apply to the goods involved in this transaction.

C) DISCLAIMER OF EXPRESS WARRANTY

Gorbel’s agents, or dealer’s agents, or distributor’s agents may have made oral statements about the machinery and equipment described in this transaction. Such statements do not constitute warranties, and Purchaser agrees not to rely on such statements. Purchaser also agrees that such statements are not part of this transaction.

D) DISCLAIMER OF SPECIAL, INCIDENTAL AND CONSEQUENTIAL DAMAGES

Gorbel and Purchaser agree that any claim made by Purchaser which is inconsistent with Gorbel’s obligations and the warranty remedies provided with Gorbel’s products, and in particular, special, incidental and consequential damages, are expressly excluded.

E) DEALER OR DISTRIBUTOR NOT AN AGENT

Gorbel and Purchaser agree that Purchaser has been put on notice that dealer or distributor is not Gorbel’s agent in any respect for any reason. Gorbel and Purchaser also agree that Purchaser has been put on notice that dealer or distributor is not authorized to incur any obligations or to make any representations or warranties on Gorbel’s behalf other than those specifically set forth in Gorbel’s warranty provided in connection with its product.

F) MERGER

This warranty agreement constitutes a final and complete written expression of all the terms and conditions of this warranty and is a complete and exclusive statement of those terms.

G) PAINTING

Every crane (excluding components) receives a quality paint job before leaving the factory. Unfortunately, no paint will protect against the abuses received during the transportation process via common carrier. We have included at least one (1) twelve ounce spray can for touchup with each crane ordered (unless special paint was specified). If additional paint is required, contact a Gorbel® Customer Service Representative at 1-800-821-0086 or 1-585-924-6262.

Title and Ownership:

Title to the machinery and equipment described in the foregoing proposal shall remain with Gorbel and shall not pass to the Purchaser until the full amount her in agreed to be paid has been fully paid in cash.

Claims and Damages:

Unless expressly stated in writing, goods and equipment shall be at Purchaser’s risk on and after Seller’s delivery in good shipping order to the Carrier. Gorbel shall in no event be held responsible for materials furnished or work performed by any person other than it or its authorized representative or agent.

Cancellations:

If it becomes necessary for the purchaser to cancel this order wholly or in part, he shall at once so advise Gorbel in writing. Upon receipt of such written notice all work will stop immediately. If the order entails only stock items, a flat restocking charge of 15% of the purchase price will become due and payable. If Purchaser cancels certain items purchased specifically for the canceled order shall be chargeable, for in accordance with the cancellation charges of our supplier plus 15% for handling in our factory. The cost of material and/or labor expended in general fabrication for the order shall be charged for on the basis of total costs to Gorbel up to the time of cancellation plus 15%.

Returns:

No equipment, materials or parts may be returned to Gorbel without express permission in writing to do so.

Extra Charge Delay: If Purchaser delays or interrupts progress of Seller’s performance, or causes changes to be made, Purchaser agrees to reimburse Gorbel for expenses, if any, incident to such delay.

Changes and Alterations:

Gorbel reserves the right to make changes in the details of construction of the equipment, as in its judgment, will be in the interest of the Purchaser; will make any changes in or additions to the equipment which may be agreed upon in writing by the Purchaser; and Gorbel is not obligated to make such changes in products previously sold any customer.

Third Party Action:

Should Gorbel have to resort to third party action to collect any amount due after thirty (30) days from date of invoice, the Purchaser agrees to pay collection costs, reasonable attorney’s fees, court costs and legal interest.

OSHA Responsibilities:

Gorbel agrees to fully cooperate with Purchaser in the design, manufacture or procurement of safety features or devices that comply with OSHA regulations. In the event additional equipment or labor shall be furnished by Gorbel, it will be at prices and standard rates then in effect, or as may be mutually agreed upon at the time of the additional installation.

Equal Employment Opportunity:

Gorbel agrees to take affirmative action to ensure equal employment opportunity for all job applicants and employees without regard to race, color, age, religion, sex, national origin, handicapped, veteran, or marital status. Gorbel agrees to maintain non-segregated work facilities and comply with rules and regulations of the Secretary of Labor or as otherwise provided by law or Executive Order.
## INSPECTION AND MAINTENANCE SCHEDULE

**G-FORCE® BX ILD INSPECTION AND MAINTENANCE SCHEDULE**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>COMPONENT</th>
<th>MAINTENANCE</th>
<th>FREQUENCY*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wire Rope</td>
<td>Check for distortion of the rope such as kinking, crushing, unstranding, birdcaging, main strand displacement, or core protrusion. General corrosion, broken or cut strands, and number, distribution, and type of visible broken wires</td>
<td>Start of each Shift</td>
</tr>
<tr>
<td>2</td>
<td>Wire Rope</td>
<td>Maintenance listed in (1), as well as reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires. Severely corroded or broken wires at end connections. Severely corroded, cracked, bent, worn, or improperly applied end connections.</td>
<td>Periodically (to be determined by qualified persons only)</td>
</tr>
<tr>
<td>3</td>
<td>Coil Cord Assembly</td>
<td>Check to make sure there is no excessive wearing of the coil cable sleeving caused by the wire rope. Check for excessive bends or pinching. Check that Mating Connector is secured to the Actuator properly. Assure the Strain Relief at the Handle is properly tightened.</td>
<td>Start of each Shift</td>
</tr>
<tr>
<td>4</td>
<td>Pendant Handle</td>
<td>Check for smooth operation of levers.</td>
<td>Start of each Shift</td>
</tr>
<tr>
<td>5</td>
<td>G-Force® Assembly</td>
<td>Conduct a visual inspection of the entire BX G-Force® unit.</td>
<td>Start of each Shift</td>
</tr>
<tr>
<td>6</td>
<td>Pulleys</td>
<td>Inspect the Slack-Idler Pulley for excessive wear. Replace Pulleys immediately if excessive wear or damage is present.</td>
<td>Every 90 Days</td>
</tr>
<tr>
<td>7</td>
<td>Limit Switches</td>
<td>Verify that the Upper and Lower Limit Switches are operating properly. Verify that the Slack Switch is operating properly. Replace Switches immediately if they are damaged.</td>
<td>Every 90 Days</td>
</tr>
<tr>
<td>8</td>
<td>Slack Switch Sliding Mechanism</td>
<td>Verify that the Slack Switch Sliding Mechanism is functioning properly. Replace Slack Switch Sliding Mechanism if not operating correctly.</td>
<td>Every 90 Days</td>
</tr>
<tr>
<td>9</td>
<td>Wheels</td>
<td>Check for cracks, pits, and/or grooves. All of these increase pull forces. If any of these conditions exist, wheels should be replaced.</td>
<td>Every 2000 Hours or Yearly</td>
</tr>
<tr>
<td>10</td>
<td>Pendant Handle</td>
<td>Perform general cleaning of the Pendant Handle, being sure to remove all debris and foreign substances that may exist.</td>
<td>Periodically based on Application (to be determined by qualified persons only)</td>
</tr>
<tr>
<td>11</td>
<td>Hardware</td>
<td>Perform routing inspection of all hardware connections, verifying that all lockwashers are compressed and nuts tightened to manufacturer’s specifications. Be sure to verify the jam nuts located between the swivel assembly and handle/tooling are properly torqued.</td>
<td>Every 90 Days</td>
</tr>
</tbody>
</table>

* Federal, state and local codes may require inspection and maintenance checks more often. Please check the federal, state and local code manuals in your area.

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**WARNING**

Any changes in rotating effort or unusual noises must be immediately identified and corrected.

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**WARNING**

DO NOT TWIST COIL CABLE ASSEMBLY. OVER TWISTING OF HANDLE WILL CAUSE SHORTING IN COIL CABLE ASSEMBLY, THEREFORE CAUSING PREMATURE UNIT FAILURE. KEEP ROTATION OF HANDLE TO LESS THAN 360 DEGREES.