



BATTING CAGE SERVICE MANUAL



Specifications subject to change without notice.



© 2019 J&J Amusements Inc. - All Rights Reserved

Published by J&J Amusements, Inc.
An Oregon Corporation

2021

J&J Amusements, Inc.

4897 Indian School Rd NE
Suite 150
Salem Oregon 97305-1126

www.jjamusements.com

Phone: 503-304-8899

Toll Free Phone: 800-854-3140

Fax: 503-304-1899

Toll Free Fax: 800-366-7505

TECHNICAL CONTACT INFORMATION

We value your feedback; technical comments and suggestions are helpful to us. Please e-mail your comments to service@jjamusements.com.

From time to time, updates may be made to this manual. For the latest updates, please visit our technical website at <http://jjamusements.com/technical/index.htm>.

IMPORTANT SAFETY NOTICE

Proper service and repair procedures are vital to safe, reliable operation of ABC batting cages, as well as to the personal safety of those performing the repairs. This manual outlines procedures for servicing and repairing ABC batting cages, using safe, effective methods. The procedures contain many NOTES, CAUTIONS and WARNINGS which should be followed (along with standard safety procedures) to reduce the possibility of personal injury or improper service, which could damage the batting cages or compromise its safety.

It is important to note that repair procedures, techniques, tools and parts for servicing ABC batting cages, as well as the skill and experience of the individual performing the work, vary widely. It is not possible to anticipate all conceivable ways, or conditions under which ABC batting cages may be serviced, or to provide cautions to all possible hazards that may result. Standard precautions should be used when handling toxic or flammable fluids, and safety goggles or other protection should be used during cutting, grinding, chiseling, prying or any other process that can cause material removal or projectiles. J&J recommends the use of safety goggles or approved glasses during all servicing of ABC batting cages.

All information contained in this manual is based on the latest product information available at the time of printing. We reserve the right to make changes at any time without notice. All rights reserved. Except as expressly provided herein, no part of the manual may be reproduced, copied, transmitted, disseminated, downloaded or stored in any storage medium, for any purpose, without prior written consent of J&J Amusements, Inc. An Oregon Corporation. J&J Amusements, Inc. grants permission to download a single copy of this manual onto a hard drive or other electronic storage medium to be viewed for personal use, provided that such electronic or printed copy of this manual contains the complete text of this copyright notice. Any unauthorized commercial distribution of this manual is strictly prohibited.

As you read this manual, you will find information that is preceded by a **NOTE** symbol. The purpose of this message is to prevent damage to the batting cage equipment, other property, or the environment.

SAFETY MESSAGES

Your safety and the safety of others are very important. To help you make informed decisions, we have provided safety messages and other information throughout this manual. Of course, it is not practical or possible to warn you about all of the hazards associated with servicing the batting cage equipment. You must use your own good judgement. You will find important safety information in a variety of forms, including:

- ✓ **SAFETY MESSAGES** - preceded by a safety alert symbol and one of four signal words:

DANGER, WARNING, CAUTION, or SAFETY ITEM.

THESE SIGNAL WORDS MEAN:

DANGER You WILL be KILLED or SERIOUSLY INJURED if you do not follow the subsequent instructions.

WARNING You CAN be KILLED or SERIOUSLY INJURED if you do not follow the subsequent instructions.

CAUTION You WILL be INJURED if you do not follow the subsequent instructions.

SAFETY ITEM This safety device was installed at the factory and may be required by state, local, or ASTM standards.

- ✓ **INSTRUCTIONS** - how to service the batting cages correctly and safely.

LIMITED WARRANTY - BATTING CAGES

J&J Amusements, Inc., Accessories, Product and Replacement Parts. This warranty is limited to J&J Amusements, Inc. Product, parts and accessories when distributed by J&J Amusements, Inc. 4897 Indian School Road NE, Suite 150, Salem, Oregon 97305-1126 USA (J&J).

Products Covered by this warranty:..... Length of warranty:

Pastime pitching machines Manufactured after 1/1/16..... 1 year
Parts and Accessories 90 day
Electrical components..... 90 day*

In no event will J&J be responsible for consequential damages and limitation of implied warranties. J&J disclaims any responsibility for loss of time or use of the products, commercial loss, transportation, or any other incidental damage. Any implied warranties are limited to the duration of this warranty.

To qualify for this warranty:

1. The accessories, product, or replacement parts must be purchased from J&J Amusements, Inc.
2. You must be the first retail purchaser. This warranty is not transferable to subsequent owners.
3. You must provide proof of original purchase.

To obtain warranty service:

To obtain warranty, purchaser must return at their expense the defective part or product to J&J. Items under warranty will be repaired or replaced by J&J without any charge for parts. Warranted items will be shipped or returned free of shipping charges to customer via UPS GROUND. Expedited shipping methods are available at purchaser's expense. Labor to replace defective parts, products and systems are excluded from this warranty and are the responsibility of the purchaser. You must obtain a Return Merchandise Authorization (RMA) number from J&J, phone number 800-854-3140 or 503-304-8899. Return the accessories, products or parts and proof of purchase, at your expense, to J&J. If the accessories, products or parts are returned to J&J without both an RMA and proof of purchase, J&J may void the warranty at its discretion.

Exclusions:

This warranty does not extend to products, accessories, or parts that are affected by misuse, poor maintenance, acts of nature, normal wear, neglect, improper installation, uses in applications not designed or intended, unauthorized alterations, or any other cause other than defects in materials and workmanship of the product. Warranty does not include aluminum baseball or softball bats resold by J&J to purchaser. This warranty does not extend to products, accessories or parts purchased for use outside of the United States or Canada.

***No warranty on opened electrical components.**

Disclaimer of consequential damage and limitation of implied warranties:

J&J DISCLAIMS ANY RESPONSIBILITY FOR ANY CONSEQUENTIAL DAMAGES OF ANY KIND OR NATURE, INCLUDING BUT NOT LIMITED TO, LOSS OF TIME OR USE OF THE PRODUCT, TRANSPORTATION, COMMERCIAL LOSS OR ANY OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGE ARISING OUT OF ANY THEORY OF RECOVERY INCLUDING WARRANTY, CONTRACT, STATUTORY OR TORT. NOTWITHSTANDING THE TERM OF ANY LIMITED WARRANTY OR ANY WARRANTY IMPLIED BY LAW, OR IN THE EVENT THAT ANY LIMITED WARRANTY FAILS OF ITS ESSENTIAL PURPOSE, IN NO EVENT WILL J&J'S ENTIRE LIABILITY EXCEED THE PURCHASE PRICE OF THE PARTICULAR GOOD SOLD. SOME STATES/PROVINCES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU. THIS WARRANTY GIVES SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

Disclaimer of Warranty

EXCEPT FOR THE LIMITED WARRANTY PROVIDED HEREIN, TO THE EXTENT PERMITTED BY LAW, J&J DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ALL WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR PURPOSE. TO THE EXTENT THAT ANY IMPLIED WARRANTIES MAY NONETHELESS EXIST BY OPERATION OF LAW, ANY SUCH WARRANTIES ARE LIMITED TO THE DURATION OF THIS WARRANTY. SOME STATES/PROVINCES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU.

Any legal action arising from claims against this warranty shall be governed by and construed in accordance with the laws of Oregon, and the exclusive forum for disputes arising out of or relating to this warranty shall be the Marion County Circuit Court for the State of Oregon, and no other state or Federal Court. Any party bringing a claim under this warranty consents to jurisdiction of such court, waives any objection to venue, and further agrees that in the event of litigation such party shall, at its own expense, provide discovery and appear for depositions in Marion County, Oregon. Contact J&J Amusements, Inc. for information on your area.

Contents

Batting range safety & operations..... 5

Important safety information.....	6
Abc standards for batting range safety & operation.....	7
Operational safety standards.....	8
Safety program for the batting cages.....	10
Safety program for the batting cages.....	11
Safety program for the batting cages.....	12
Daily maintenance, visual inspections and operational procedures	13
Weekly, monthly maintenance schedule & operational procedures	14
Daily operational forms and checklists.....	16
Daily operational forms and checklists.....	17

Servicing equipment..... 18

Servicing equipment.....	19
Wheel shaft adjustments	22
Pinch roller collar install orientation	23
Ball viewing chute adjustment and it's relationship to the 90-degree drop	24
Self-locking collar directions.....	25
Batting cage winterization	26

Display panel operation manual..... 27

Display panel operation manual.....	28
Display panel operating instructions.....	31
Time rental:.....	31
Ball rental:.....	31
Display panel operating instructions.....	32
Programming procedures	36
Programming factory setting, ball & coin count	37
Programming to use select-a-pitch	38
Select-a-pitch system.....	39
Select-a-pitch introduction	40
Select-a-pitch daily startup procedures	41
Programming baseball speed	42
Programming fast pitch softball speed.....	43
Enter elevation programming mode	44
Elevation programming procedure	45
Starting a select-a-pitch game	46

Troubleshooting..... 47

Troubleshooting introduction	48
Troubleshooting - display panel.....	49
Troubleshooting - coin box.....	51
Troubleshooting - light box	52
Troubleshooting - pitching machine.....	56
Troubleshooting - automatic conveyor system	58
Troubleshooting - light box warning lights and circuit board controller block error code guide	60
Kb electronics return authorization form	61
Phenix controls return authorization form	62

Wiring schematics 63

Coin mech interface - triple phone jack	64
Coin box wiring - single cage	65
Coin box wiring - dual cage.....	66
Coin box wiring - single cage with select-a-pitch	67
Coin box wiring - dual cage with select-a-pitch.....	68
Coin box wiring - card reader (single).....	69
Coin box wiring - card reader (dual).....	70
Pt-8 circuit board voltages	71
Pt-8 circuit board overview - hard wire	72
Pt-8 circuit board overview - phone jack.....	73
3-Phase motor wiring.....	74
Variable speed motor controller - select-a-pitch	75
Variable speed motor controller - pastime.....	76
Hopper circuit breaker wiring	77
Current sensor adjustment procedure.....	78
Current sensor wiring.....	79

IHS (sa) system 80

Sa-8 ball & coin count programming instructions.....	81
Sa-8 circuit board	82
Overview of the IHS system.....	83

Center pole winch & collar..... 84

Winch & center pole collar stops	85
Cable & winch.....	86
Center pole winch & collar	87

Thern winch manual..... 90

BATTING RANGE SAFETY & OPERATIONS

CONTENTS IN THIS SECTION

Batting cage stall & batters box	page 6
ABC standards for batting range safety & operation	page 7
Operational safety standards.....	page 8
Safety program for the batting cages.....	page 10
Daily maintenance	page 13
Weekly maintenance	page 13
Monthly maintenance	page 14
Daily operational forms & checklists	page 16

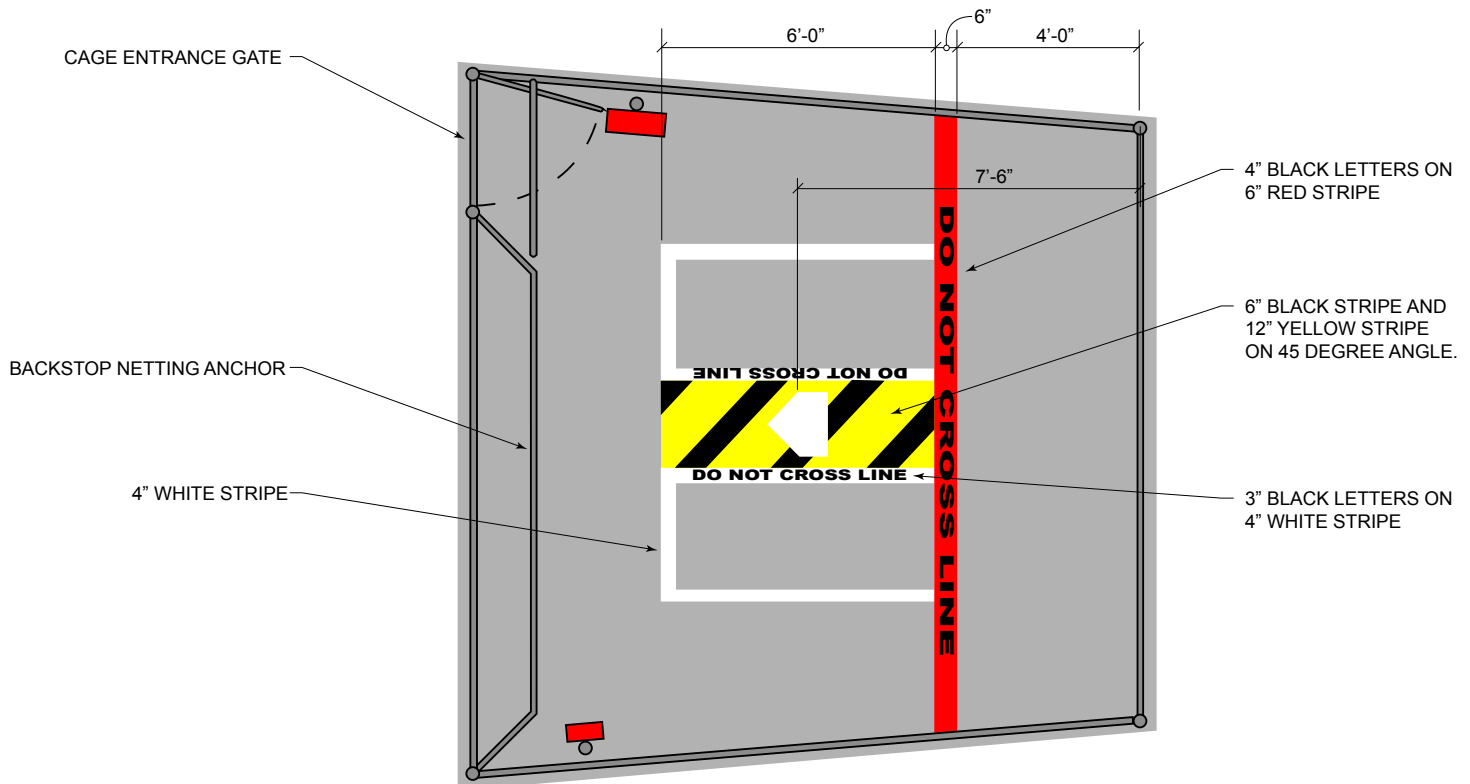
IMPORTANT SAFETY INFORMATION

BATTING CAGE STALL & BOX

The illustration below is an overview of a typical batting stall and batters box. Please note the 7'-6" dimension from the opening of the stall to the center of Home plate. This dimension will ensure the "Batters Box" is adequately back far enough from the opening of the stall and reduce the risk of "fouled balls" striking another batter. If your Batters Box is not at least 7'-6" as shown, you will need to move your boxes back.

Also note that we suggest you paint a red **"DO NOT PASS RED LINE"** line as shown on this drawing. The purpose of this line is to keep customers from going forward of this line. We clearly do not want customers out in open area, in the pit or batting in an area which will cause the flight of the ball to enter another stall.

Please implement these changes or additions for the stalls immediately. If you have any questions please call ABC.



ABC STANDARDS FOR BATTING RANGE SAFETY & OPERATION

DESIGN STANDARDS

These batting range design standards apply to all operators/owners of ABC commercial batting ranges. These design standards promote and advance safe batting range operations. These standards should be understood and followed by all operators/owners of commercial batting ranges. ABC is not responsible for the compliance of these design standards or the consequences of non-compliance.

1. All batting areas (batting stalls) must be well defined and have marked areas where the batter must stand.
2. All batting areas (batting stalls) must have a well defined and marked area where the balls will be generally thrown. Batters boxes and home plates must be painted in batting area. Batting stalls must be a hard surface, recommended materials include concrete, asphalt or wood.
3. All batting areas (batting stalls) must have a well defined and marked areas where batters are excluded.
4. Sloping floors, to allow for balls to roll out of batting area, should be used in all batting range operations.
5. Batting stalls must have adequate width to protect all batters and allow for batters swing width.
6. Batting stalls must have adequate depth to provide protection for batters and adjacent batters.
7. All batting stalls must have adequate lighting to provide complete visibility of pitched balls from pitching machine to home plate.
8. All pitching systems must employ Warning Light(s) or other visible methods to signal the batters that the pitching mechanism is ON and is capable of pitching a ball at any time.
9. Spectators must be adequately protected from contact with balls by netting and fencing systems. Balls should never be able to escape the batting cage area.
10. Equipment system must provide for stop and starting operation while operating continually ("rental play").
11. All batting stall gates must employ self-closing mechanisms to prevent balls from exiting the batting stalls.
12. All batting stalls which operate "dual-pitching mechanisms" (both baseball and softball pitching mechanisms) must be adequately marked to inform batters of dual-use mechanisms.
13. All batting stalls must have protective padding on front of the vertical pipes to cushion the balls from ricocheting back towards the batters.

OPERATIONAL SAFETY STANDARDS

These operational safety standards apply to all operators/owners of an ABC commercial baseball and softball batting range. They are intended to inform the operators/owners of the dangers and risks associated in the operation of the batting range and to promote the safe operation of the batting cages. All standards should be understood and followed to facilitate safety in the batting cages. ABC is not responsible for the compliance of these safety standards or the consequences of non-compliance.

1. All batting stalls must adequately display a sign indicating how to operate the batting cage system. This sign must include the following information: How to start the game, When balls will be pitched, And when the game is over.
2. All batting range operations must adequately display a sign indicating that pitching machines will throw both balls and strikes.
3. All batting range operations must adequately display "Warning/Rules" sign's which include the following warnings and rules:
 - ✓ Batters MUST wear helmets with face mask protection at all times.
 - ✓ If machines are pitching out of the strike zone immediately alert the attendant.
 - ✓ Only one person in the batting cages at a time during play. No coaches allowed in cage during game play.
 - ✓ No switch hitting during game.
 - ✓ Batters must wear shoes. (No Baseball-Softball Cleats)
 - ✓ No person under the influence of Drugs or Alcohol is permitted to use the batting cages.
 - ✓ Report all accidents immediately.
 - ✓ These pitching machines throw both balls and strikes. Players should "Be Alert" at all times.
 - ✓ Do not stand on home plate.
 - ✓ Watch for balls rolling under feet.
 - ✓ No one under the age of 6 years old is permitted to use the batting cages.
 - ✓ No one under the age of 16 is allowed to use cages throwing the effective speed of 70 - 75 Mph.
 - ✓ An adult must accompany all batting cage players under the age of 10.
 - ✓ Close gates at all times when entering or exiting the cages.
 - ✓ No practice swings outside of cages unless in designated areas.
 - ✓ During or after the game, do not pick up balls from ground. Do not throw balls back at pitching machines.

DANGER: Injuries could result from the use of this device. Users should assume the inherent risks of batting baseballs and softballs. If users have any questions about the use of this device or the inherent risks associated with the use of this device, ask the attendant before using the batting cages.

4. In addition to posting "Warning/Rules" signs, Operators/Owners of commercial batting ranges must comply with the following operational safety standards:
 - ✓ At least one trained attendant must be present at all times at the batting range to supervise the safe operation of the batting range. Attendant must have reviewed and understood this manual and ABC training video tape.
 - ✓ At least one trained attendant must be present at all times to supervise and/or conduct the maintenance program of the batting range equipment/netting system. Attendant must have reviewed and understood this manual before performing any maintenance or servicing.
 - ✓ At least one attendant must be present at all times trained in the "Safety Rules" of the batting range. Attendant must have reviewed and understood this manual and ABC training tape.
 - ✓ Operator/Owner of the batting range must keep batting range equipment system maintained at all times to ABC's specifications. This manual details ABC's specifications. It must be reviewed and understood in order to maintain the ABC batting range equipment system. Keep this manual at the batting operation at all times for review. Refer to sections titled "MAINTENANCE" and "SERVICING" for specifications.
 - ✓ ABC maintenance and operational forms must be completed by owner/attendant and stored for later review to confirm that maintenance and operational procedures have been followed. Refer to section titled "FORMS".
 - ✓ Attendant must check ball pitching accuracy of all pitching machines at least once per day. If the accuracy has degraded, refer to the "TROUBLE SHOOTING GUIDE" section for proper adjustments.
 - ✓ Operator/Owner must check daily, the condition of the balls. All balls showing signs of excessive wear, deformation, cracks, breakage or when the dimples on the balls are less than 50% of their original depth. If any of these conditions exist, remove balls from the batting range system immediately. Replace system with new balls. New balls cannot be mixed with old balls!
 - ✓ Operator/Owner must train all attendants in the safe operation of the batting range and insist that all attendants maintain and promote a safe operation at all times. Training must include reviewing of this manual and ABC training video tape.

- ✓ Attendants or anyone inside of batting range must wear protective helmet with face guard at all times.
 - ✓ Servicing of equipment system must be completed by a trained and qualified person having reviewed and understood this manual and ABC training video tape.
5. Follow all other manufacturers' operation and warnings when operating Center Pole Winch. All operators of Center Pole Winch must review and understand all operating and safety instructions
 6. Owner/Operator should establish and implement a Safety Program similar to the program detailed in the following "SAFETY PROGRAM FOR THE BATTING CAGES"
 7. Balls remaining in hitting stalls must be "Cleared" by attendant before customer enters cage. (ALSO REFER TO SECTION TITLED "MAINTENANCE" FOR REGULARLY SCHEDULED MAINTENANCE and OPERATIONAL PROCEDURES).

SAFETY PROGRAM FOR THE BATTING CAGES

The foregoing is a sample "safety program" for a commercial batting range. Please keep in mind that a safety program may include other elements than those detailed here. All batting range operations should have a management-sponsored comprehensive safety program.

MANAGEMENT

It is essential that the management of the batting cage support the development and implementation of an effective safety program. It is the responsibility of the management to commit to a safety program and to communicate this commitment to all of management's employees. The Safety Program must include employee safety as well as guest safety and methods to carry out the program.

EMPLOYEE SAFETY

The safety of the employee must be the first priority of any safety program. Employee safety is mandated by agencies including federal, state and local municipalities. Be certain that the employees understand the risks that they are exposed to and how they can avoid these risks. Just as management must commit to the safety program, employees must also be willing to accept their responsibility to the program.

EMPLOYEE SAFETY EXPOSURE

1. Hit by pitched ball
2. Hit by batted ball
3. Hit with bat outside of batting cage
4. Injury from contact with mechanical parts (i.e. wheels, belts, motors, electrical components, etc...)
5. Hit by ball in the "pit area"
6. Injuries while batting or giving instruction
7. Slip on floor
8. Fire or robbery
9. Horse play
10. Operating Center Pole Winch (raising and lowering netting)

EMPLOYEE RISK REDUCTION

1. Thoroughly train staff regarding all Safety/Warning policies (Warning Signs, etc).
2. Wear Batting Helmets with Face Guards at all times while in hitting area, including "pit area"
3. Sound a warning to batters (whistle, yell, etc...) when going to "pit area"
4. Use safety netting in pit to block holes in netting while working in area.
5. Thoroughly train all staff on operation of all pitching machines and batting range equipment systems. Have all staff review maintenance procedures with ABC Owner/Operator Manual.
 - ✓ Train at initial hire.
 - ✓ Re-train annually using ABC Operational and Technical Manual and ABC training video tape.
6. Thoroughly train staff of all Operating Standards relating to safety and operations
7. Turn off and unplug all electrical components when servicing equipment
8. Give instructions from outside of cages-Do Not enter cage when player is batting
9. Stop machines from pitching immediately when accidents occur or when rule enforcement is necessary.
10. Do not use batting cage after accident has occurred until all equipment has been checked for proper operation
11. Train staff for all emergency policies.
 - ✓ Police telephone number
 - ✓ Fire telephone number
 - ✓ Ambulance telephone number
12. All staff must have a "NO TOLERANCE RULE" for breaking any Safety Rules or Procedures

GUEST SAFETY

Guest safety is essential to the batting range success. All guest safety programs must begin with the Employee safety program. Employees must be committed to this vital aspect of the business. The employees will be the most responsible for any Guest Safety Program implemented by Management.

SAFETY PROGRAM FOR THE BATTING CAGES

GUEST RISK REDUCTION

1. Hit by pitched ball.
2. Hit by batted ball.
3. Hit by bat outside of cages.
4. Player too young or inexperienced to use a batting cage.
5. Batters not standing in Batters Box.
6. Non-Contact injuries while batting (i.e. ankle, knee, etc...)
7. Players/Guest not complying with all posted Rules.
8. Food poisoning.
9. Fire.
10. Slip and fall.
11. Horseplay.

GUEST RISK REDUCTION

1. List and display all SAFETY/WARNING SIGNS and RULES for quest to follow (see "Operation Safety Standards")
2. Have all employees understand these SAFETY/WARNING SIGNS and RULES and ENFORCE THESE RULES! (see "Operational Safety Standards")
3. At least ONE batting range EMPLOYEE MUST BE ON DUTY AT ALL TIMES DURING CAGE OPERATION!
4. Pitching Machines, Warning Lights and related Feeding Systems must be adjusted and maintained at all times and must be in good working order at all times while batting cage is available for play.
5. Signs must be posted stating type of cage (baseball or softball) and speeds of pitch in each cage.
6. Regular cleaning of floor/concrete to prevent slipping and to keep balls clean.
7. All netting and protective fencing must be repaired, maintained and replaced when necessary.
8. Inspect, clean and replace worn balls regularly.
9. Follow all local health and safety codes.
10. Employee must stop balls from pitching immediately when any accident occurs. Attend to guest immediately (refer to Management' Emergency Procedures). Do not allow batting in the batting cage where accident occurred until all equipment has been checked for proper operating condition. File Incident Report.
11. Completely train and re-train all employees about safety risks of your guests and themselves!
12. INSIST THAT EMPLOYEES HAVE ALL GUESTS FOLLOW THE POSTED RULES EMPLOYEES MUST HAVE A "ZERO TOLERANCE RULE" FOR GUEST BREAKING POSTED RULES!
13. EMPLOYEES MUST TAKE IMMEDIATE STEPS (stop pitching machines and remove batter from cage) TO MINIMIZE SAFETY RISKS TO GUEST WHEN RISK ARE APPARENT!

FIRE PROTECTION

Fire protection should always be a part of Management's Safety Program. Consult with local fire authorities about their requirements. Be certain that employees have knowledge about the fire protection available at the batting cage.

FIRST AID

Management should have four basic areas of responsibility for First Aid.

1. Employee First Aid - Check with local agencies about First Aid Kits and your responsibility for Employee First Aid.
2. First Aid to guests.
 - ✓ Emergency First Aid - Have Emergency plan documented for employees to follow
 - ✓ Courtesy First Aid - Have Band-Aids, ice, etc...)
3. Record Keeping and Reporting - It is essential that all First Aid (either employee or guest related) be documented and maintained for future reference.
4. Injury Claims defense - Providing first aid and documenting the type and extent of all injuries and how the injury occurred is necessary for any Injury Claim Defense.

SAFETY PROGRAM FOR THE BATTING CAGES

INSPECTION

A Safety Program should address the need for inspections. These inspections should be focused in at least four areas:

1. Inspection of employees work area.
2. Inspections to insure guest safety—see Regularly scheduled Maintenance and Operational Procedures in “Maintenance” section.
3. Inspections for housekeeping and fire protection.
4. Required inspections for Federal, State and Local Requirements.

ACCIDENT INVESTIGATION

In order to reduce accidents from occurring, a preventive program must be in place. Recognizing potential risks and taking the appropriate steps to minimize or eliminate these risks is critical. All accidents must be investigated and documented, even if injuries have not resulted from the accident. Communicating these accidents should be a regular occurrence within the Safety Program.

SAFETY TRAINING

Safety training should not be confused with Job Training. Safety training should be conducted singularly and considered a separate responsibility of the employee. Safety Training should be conducted when the employee is first hired and should be reviewed at least once a year.

RECORD KEEPING

Record Keeping for the Safety Program should include several records including; Employee Injury Reports, Guest Injury Reports, Inspection/Maintenance Reports, documented Safety Program Training and reviews and “Accident Investigation” meetings. (Refer to section “Daily Operational Forms & Checklists”).

BATTING RANGE EQUIPMENT MAINTENANCE

Equipment maintenance should only be performed by qualified persons with a full understanding of the equipment and how it operates. It is also very important that the person maintaining the equipment understands about the batting range operation and risks involved with repairing and maintaining the system. All daily, weekly, monthly and other periodic maintenance should be conducted on the pitching machine equipment and the related equipment. Refer to the section titles “MAINTENANCE” in the “ABC Owner/Operators Manual” for specific maintenance and operational procedures. Document all maintenance and operational procedures and file for future reference.

COMMUNICATIONS

The Safety Program must be communicated clearly and understood by every person involved in it’s implementation. Communication techniques should include written material along with on-site instructions and directions. All training sessions should be documented and filed for future reference.

HOUSEKEEPING

Safety Program should include a Housekeeping element and all staff should understand the necessity of cleanliness.

EMERGENCY PROCEDURES

Management must detail Emergency Procedures which would be followed in the event of any emergency. These emergencies will include NATURAL DISASTERS (wind, rain, earthquake, etc...), ACCIDENTS (injuries) and MAN-MADE DISASTERS (bomb threats, structural, power outages, etc...).

DAILY MAINTENANCE, VISUAL INSPECTIONS AND OPERATIONAL PROCEDURES

DAILY:

1. Clean debris from batting area (pit, stalls, etc...)
2. Visually inspect the coin box for damage and repair as necessary.
3. Visually inspect batters stalls for any holes in netting, properly hung back stop pads and well marked batters boxes. Repair if necessary.
4. Walk the inside perimeter of the cage visually checking for ripped netting ties at lower fence, holes in net (including overhead), broken cables, and fencing connections.
5. Visually check pitching machine area (the pit) for netting holes, rips in netting tie downs, etc. Repair if needed.
6. Visually check where balls are pitching through the netting holes. Balls must pass through the middle of the holes. Make adjustments to net holes as needed.
7. Visually check light box warning lights for proper operation. Replace or repair any broken lens, defective light bulbs, loose or disconnected wires etc...
8. Visually check 90 degree drop for proper alignment with ball chute. Check proper spacing between ball drop from 90 degree drop and top of ball chute. Proper spacing is 3.5 inches of drop for baseball and 4.5 inches of drop for softball. Adjust as necessary.
9. Visually inspect ball chutes and ball guide chutes for proper alignment.
10. Visually inspect pinch roller wheel for damage or wear and verify it is tightened securely. Replace if necessary.
11. Visually inspect pitching wheels for damage or wear. Replace if necessary.
12. Visually check guide chute "micro switch" cord from light box for proper attachment. Be certain that each wire lead has a properly attached crimp-on "fork terminal" and that it is firmly connected to the micro switch leads. Replace "wire ties" that attach micro switch wire to ball guide chute if broken.
13. Manually feed balls through pitching machine and watch carefully for accurate pitches and make adjustments as necessary. Drop a token in each coin box and count the number of pitches to assure micro switch is counting correctly. Check for proper sequencing of light box.
14. Turn on hopper/feeding system and observe its operation.
15. Visually check underneath fiberglass shroud at the bottom of the conveyor system before the machines have been turned on for any debris that could block the conveyor.
16. Visually check bats for cracks and worn out grips. Replace as needed.
17. Visually check all batting helmets for cracks or defects. WARNING: All helmets must have protective face masks attached. Replace helmets/face masks as needed.
18. Visually check balls for excessive or uneven wear, cracks or breaks. Replace as needed. Remember, never mix old balls with new balls. Replace balls all at one time to assure consistent ball wear.
WARNING: Whenever servicing or conducting inspections, always keep loose clothing and long Hair away from any moving parts!
19. See section "Daily Operational Forms & Checklists".

WEEKLY:

1. Batting cage floor: check that the entire batting cage surface is clean & clear of any debris (clean as needed).
2. With pitching machine turned off, remove belt cover and check condition of belt.
3. Check tension of BALL conveyor belt. Loosen or tighten as needed.

WEEKLY, MONTHLY MAINTENANCE SCHEDULE & OPERATIONAL PROCEDURES

MONTHLY:

1. Grease pillow blocks at both ends of the conveyor. (1 pump)
2. Lubricate shaft bearings - one pump every month per bearing. DO NOT OVER GREASE- this can reduce the life of the bearing.
3. Clean debris from sump area below fiberglass shroud.
4. Check roof over pitching machines for broken wood, torn or loose outdoor turf, Repair as necessary.
5. Check lighting for all cages.
6. Re-paint batting stall home plate and batters boxes as needed.
7. All batting stall gates must have auto-closing springs. Check them for proper tension (If your gates do not have auto-closing springs, install them). Check for gaps in gates where balls could escape and adjust as necessary.
8. Clean dust off pitching machine motors.

COIN BOX	DAILY	WEEKLY	2 WEEKS	MONTHLY	3 MONTH	6 MONTHS	AS NEEDED
Token insert cleaning.				✓			
Electrical connections		✓					

GENERAL	DAILY	WEEKLY	2 WEEKS	MONTHLY	3 MONTH	6 MONTHS	AS NEEDED
Batters box & home plate.				✓			
Self closing gate doors.	✓						
Warning sign condition.		✓					
Check bats condition.	✓						
Check ball condition.	✓						
Check and clean outside/inside batting helmet	✓						

LIGHT BOX	DAILY	WEEKLY	2 WEEKS	MONTHLY	3 MONTH	6 MONTHS	AS NEEDED
Yellow & red LED lights working.	✓						
Power cords.	✓						
Electrical connections.	✓						
Circuit board mounting screws.				✓			
Door clamps.							✓

PITCHING MACHINE	DAILY	WEEKLY	2 WEEKS	MONTHLY	3 MONTH	6 MONTHS	AS NEEDED
Shaft bearing - lubrication (1 pump)				✓			
Crank handle - lubrication				✓			
Shaft bearing set screws				✓			
Pitching accuracy	✓						
Wheel wear		✓					
Wheel cleaning		✓					
Drive belt inspection		✓					
Motor intake vent cleaning.				✓			
Check 90 degree drop adjustment with ball chute	✓						

CONVEYOR SYSTEM	DAILY	WEEKLY	2 WEEKS	MONTHLY	3 MONTH	6 MONTHS	AS NEEDED
Pulley bearings - lube (1-2 pumps)				✓			
Conveyor belt tension							✓
Power cord inspection		✓					
90 Degree drop alignment	✓						
Pinch roller wheel adjustment		✓					
Pinch roller wheel set screw			✓				
Pinch roller electrical connections		✓					
Pinch roller motor to mounting plate screws		✓					

DAILY OPERATIONAL FORMS AND CHECKLISTS

BATTING RANGE DAILY REPORT

Day Super:	Date:
Night Super:	Date:
Time In:	Time Out:
Time In:	Time Out:

Microprocessor Reading

Cage #	Closing Display Readings	Opening Display Readings	Total Plays
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
Time Rental	Closing Rental Readings	Opening Rental Readings	Total Plays
15 min			
30 min			
45 min			
60 min			
90 min			
Ball Rental	Closing Rental Readings	Opening Rental Readings	Total Plays
50 balls			
100 balls			
150 balls			
250 balls			
ManI			
Bill Charger	Closing Readings	Opening Readings	Total Amount
\$1.00			
\$5.00			
\$10.00			
\$20.00			
Weather Information		Coupons / Free Game	
Approx. High:		1-Free Token:	
Approx. Low:		2-Free Tokens:	
Comments:		3-Free Tokens:	
		Gift Certificate:	

DAILY OPERATIONAL FORMS AND CHECKLISTS

CHECK	DATE	DAILY CHECKLIST	INSPECTED BY:
		Clean debris from batting area (pit, stalls, etc...).	
		Visually inspect the coin box for damage and repair as necessary.	
		Visually inspect batters stalls for any holes in netting, properly hung backstop pads, well marked batters boxes, verify gates have return springs attached and that the gates fully close. Repair if necessary.	
		Walk the inside perimeter of the cage visually checking for ripped netting ties at lower fence, holes in net (including overhead), broken cables, and fencing connections.	
		Visually check pitching machine area (the pit) for netting holes, rips in netting tie downs, etc. Repair if needed.	
		Visually check where balls are pitching through the Netting Holes. Balls must pass through the middle of the holes (not closer to any edge of hole). Make adjustments to net holes as needed.	
		Visually check light box warning lights for proper operation. Replace any broken lens or defective light bulbs.	
		Visually check 90 degree drop for proper alignment with ball chute. Check proper spacing between ball drop from 90 degree drop and top of ball chute. Proper spacing is 3.5 inches of drop for baseball and 4.5 inches of drop for softball. Adjust as necessary.	
		Visually inspect ball chutes and ball guide chutes for proper alignment.	
		Visually inspect pinch roller wheel for damage or wear. Replace if necessary.	
		Visually inspect pitching wheels for damage or wear. Replace if necessary.	
		Visually check guide chute "micro switch" cord from light box for proper attachment. Be certain that each wire lead has a properly attached crimp-on "fork terminal" and that it is firmly connected to the micro switch leads. Replace "wire ties" that attach micro switch wire to ball guide chute if broken.	
		Manually feed balls through pitching machine and watch carefully for accurate pitches and make adjustments as necessary. Drop a token in each coin box and count the number of pitches to assure micro switch is counting correctly. Check for proper sequencing of light box.	
		Turn on hopper/feeding system and observe its operation.	
		Visually check underneath fiberglass shroud at the bottom of the conveyor system before the machines have been turned on for any debris that could block the conveyor.	
		Visually check bats for cracks and worn out grips. Replace as needed.	
		Visually check all batting helmets for cracks or defects. WARNING: All Helmets Must Have Protective Face Masks Attached. Replace helmets/face masks as needed.	
		Visually check balls for excessive or uneven wear, cracks or breaks. Replace as needed. CAUTION: Remember, never mix old balls with new balls. Replace balls all at one time to assure consistent ball wear.	



SERVICING EQUIPMENT

CONTENTS IN THIS SECTION

Servicing equipment..... page 19

WHEEL shaft adjustment page 22

Pinch roller collar install orientation page 23

Ball viewing chute adjustment and its relationship to the 90 degree drop page 24

Self-locking collar directions..... page 25

Batting range winterization page 26

SERVICING EQUIPMENT

PITCHING MACHINES

CAUTION:

Accuracy of the pitching machine should be checked every day before opening and periodically throughout the day. All adjustments must be made while the hitting stall is vacant of employees or customers. Verify that the ball is consistently pitching over home plate before allowing any customers to enter the hitting stall. (While servicing or adjusting equipment always keep loose clothing and long hair away from all moving parts! Serious injuries could result).

BALL VELOCITY ADJUSTMENT

The speed of the ball is increased or decreased by adjusting the “AC Speed Controller”. This is accomplished by turning the “AC Speed Controller knob” in the appropriate direction. Standing behind the machine, a clockwise rotation of the knob will increase velocity, while a counterclockwise rotation will decrease velocity. The trajectory (High/Low) of the pitch and Right/Left adjustment will need to be checked and/or re-adjusted after any speed change. For exact MPH of pitches a hand held radar gun would be required.

HIGH/LOW ADJUSTMENT

The pitching height may be raised or lowered by turning the “High/Low Crank Handle” in the appropriate direction. A clockwise rotation will raise the pitch, while a counterclockwise rotation will lower the pitch. To make a trajectory adjustment, loosen the “High/Low Crank Jam Nut”, and turn the handle in the desired direction. When the adjustment has been completed, tighten the “High/Low Crank Jam Nut” against the High/Low adjust Bar (towards the pitching machine frame). Elevation Control System adjustments are done by pushing the Up or Down buttons located in the batting stall at the hi/low box.

RIGHT/LEFT ADJUSTMENT

Pitches may be adjusted right or left by two methods. For minimal adjustments, use the “Right/Left Adjust Knob” located on the post mount assembly. To make an adjustment, loosen the R/L Adjust Knob Jam Nut” and turn the knob in the appropriate direction. When the adjustment has been completed, tighten the “R/L Adjust Jam Nut” to secure in position. For large right or left adjustments, turn knob until post mount assembly is positioned approximately halfway of it’s travel. Loosen nuts on U-Bolt and re-position entire machine so that balls are passing over the center of home plate. Tighten U-Bolt by alternating back and forth between the two nuts, equally tightening each nut until secure.

Once U-Bolt is tight, check pitch and fine tune using the “Right/Left Adjust Knob”. Be sure to tighten jam nut when adjustment is complete.

SELECT-A-PITCH OPTION

The “Ball velocity adjustment” is done automatically through the programmed speed interface mounted inside the AC speed controller.

NOTE: The AC speed controller knob is disconnected and will not adjust speeds.

The “High/low adjustment” is done automatically through the programmed actuator mounted on the pitching machine in place of the manual high/low adjuster.

See Select-A-Pitch section for details.

SERVICING EQUIPMENT

IMPORTANT NOTE: It is common that after a rain storm or on a humid day your front machine net will sag, when this happens the net ring will lower, ultimately obstructing the flight of the ball. It is recommended that anytime this happens you immediately shut down that cage and re-adjust the net ring.

ADJUSTING NET RING

WARNING: Before any adjustment is made, make sure that nobody is batting in any of the cages. ABC recommends that you adjust the net rings in the morning before you open to the public, or after you close. Keep loose clothing and long away from all moving parts.

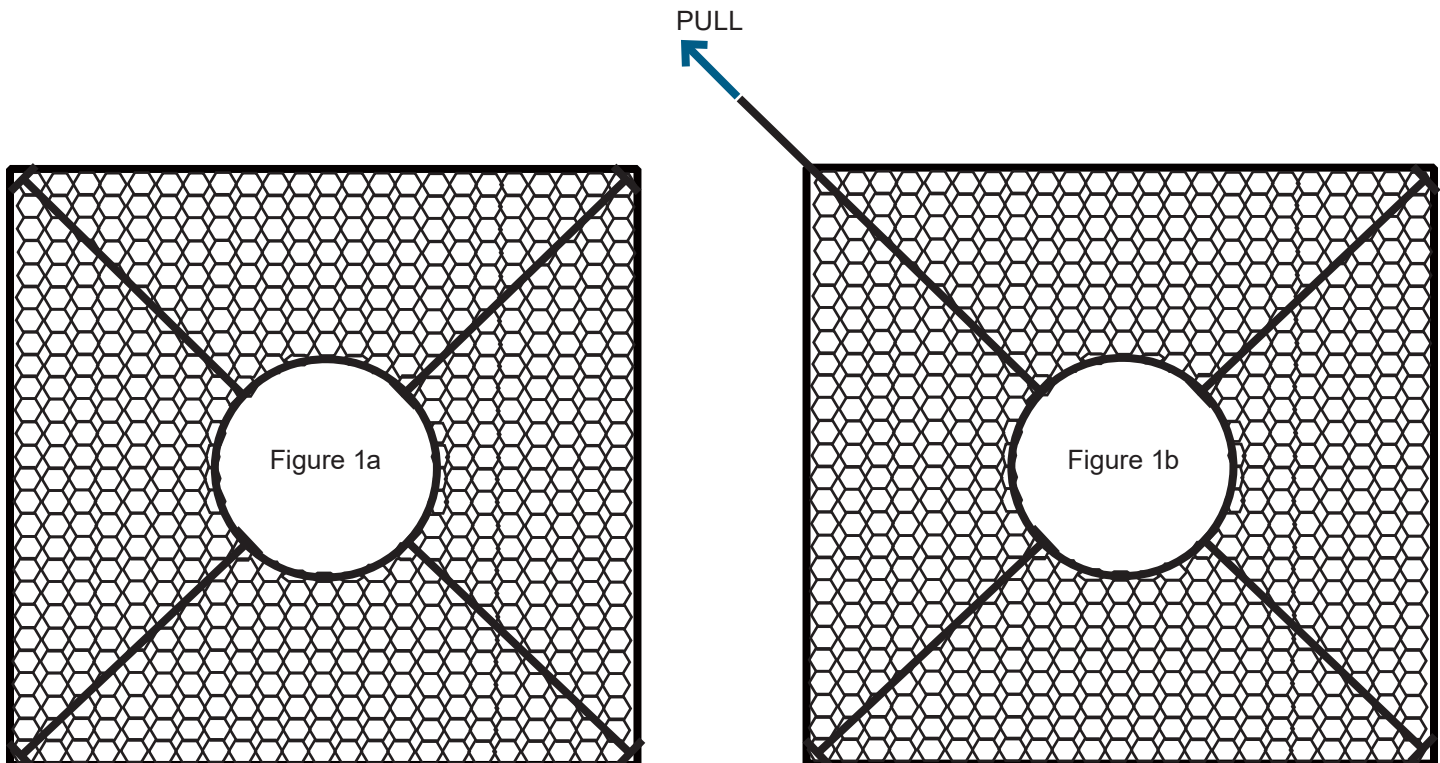
1) With a game activated and pitching, stand behind the machine and watch the flight of the ball to determine where it is hitting the net ring. After you have verified where the ball is hitting the ring, un-plug the light box power cord from the receptacle and mark the spot where the ball is hitting with a piece of tape.

2) For this step you will need 20 ft. of 1/4" nylon rope cut at 5 ft. lengths. With the four lengths of rope in your hand, position yourself in front of the pit net facing the pitching machines. Take one rope at a time and attach them as shown in figure 1a.

3) Now that the net ring is secured in place, it's time to adjust the ring directly in the center of the ball's flight path. Locate the area on the ring where you marked it with tape. Using figure 1b. as an example, un-tie the rope in the area marked with tape and pull the rope until the center of the ring is directly in the middle of the ball's flight path.

WARNING: Before you allow anyone to hit in the cage, it's important that you pitch a round of balls through the ring to verify that the ball is flying directly through the center.

NOTE: It might take 2 or 3 adjustments to center the ring.



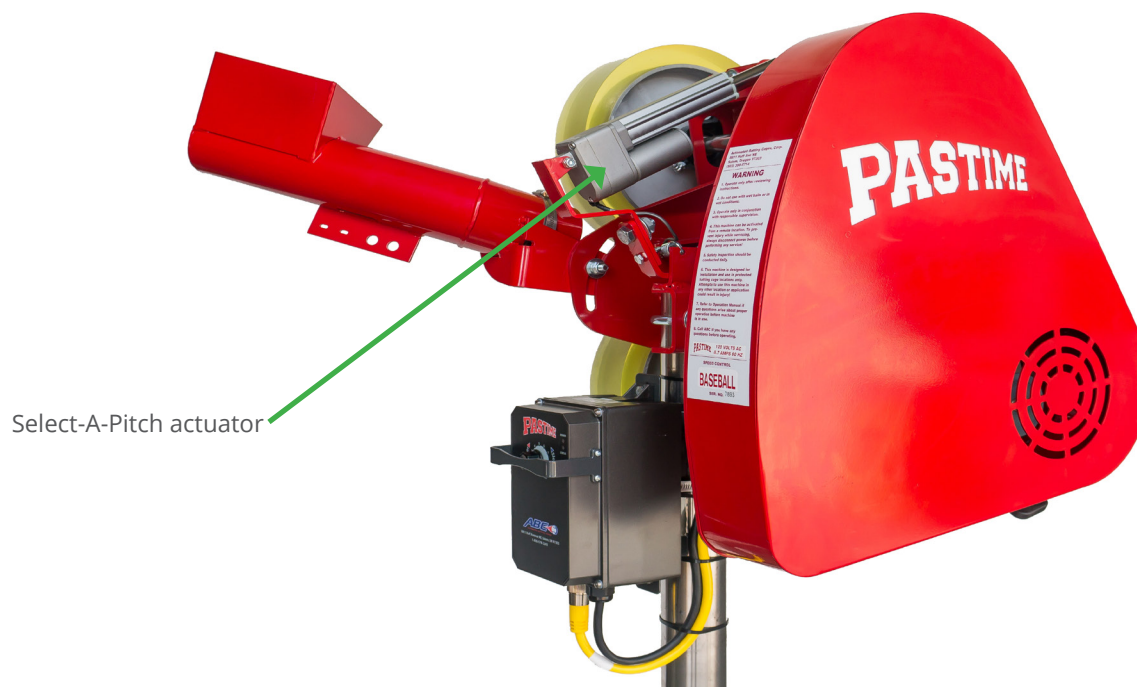
SERVICING EQUIPMENT

Pastime Pitching Machine with manual height adjustment



Hi/low crank handle

Pastime Pitching Machine with Select-A-Pitch Actuator height adjustment



Select-A-Pitch actuator

WHEEL SHAFT ADJUSTMENTS

X = Top edge of the upper shaft to the top edge of the bottom shaft.

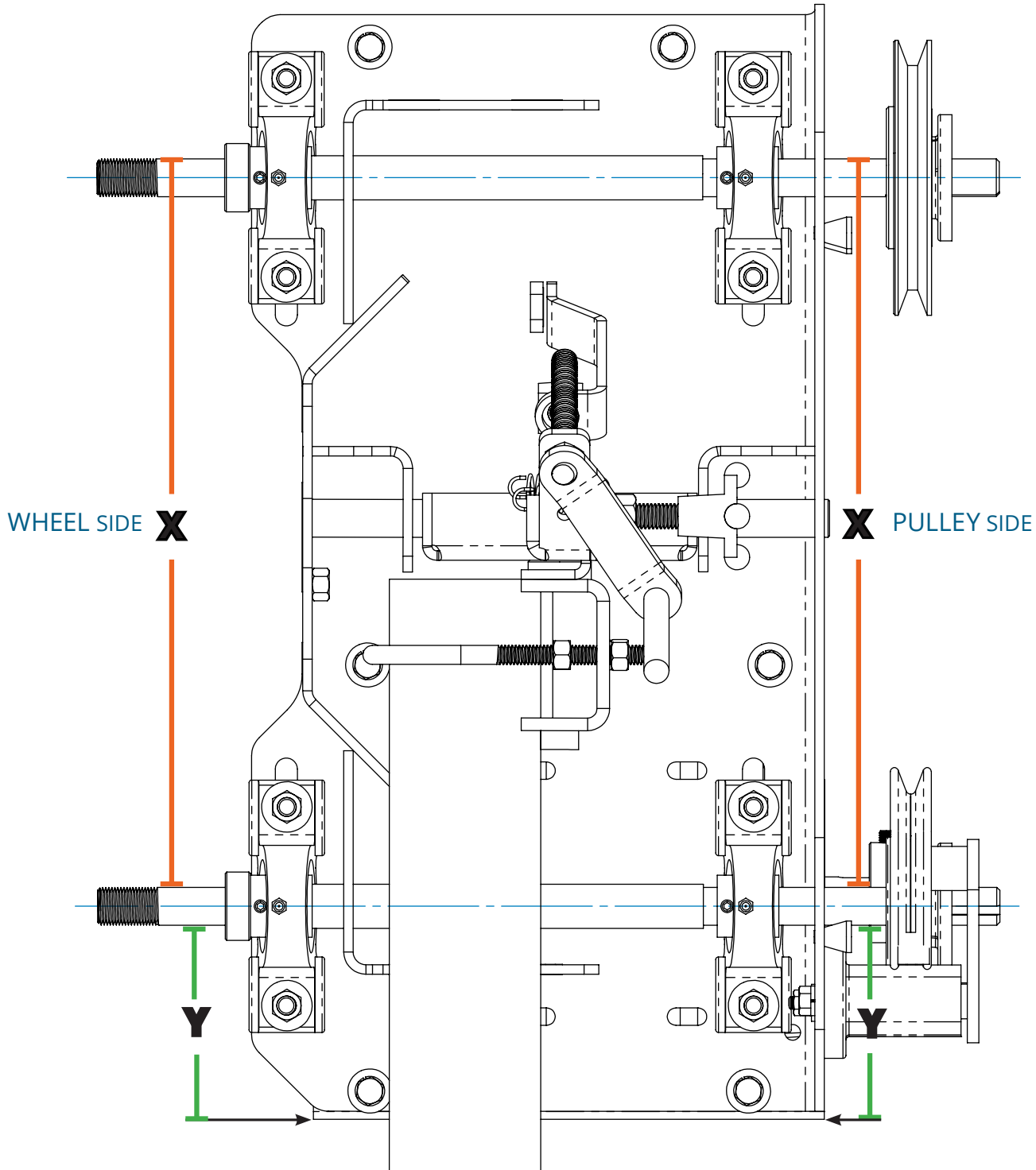
• Baseball = 13" • Softball = 14"

Y = Bottom edge of the lower shaft to the bottom edge of the frame.

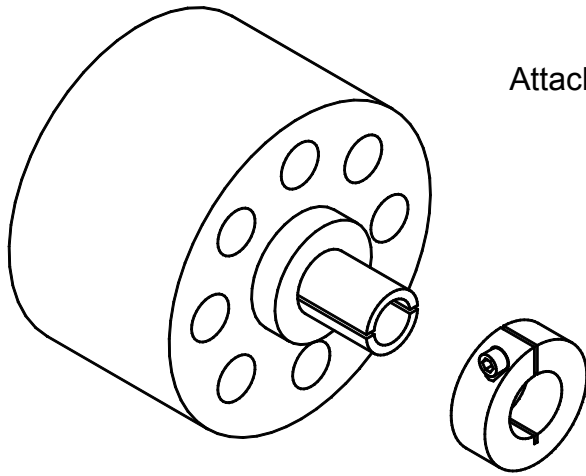
• Baseball = 4 1/2" • Softball = 3 5/8"

NOTE:

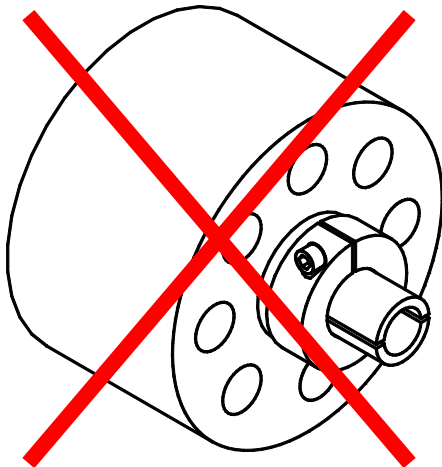
When checking "X" and "Y" dimensions, verify the measurements on both the wheel and pulley sides of the shafts are parallel to the frame.



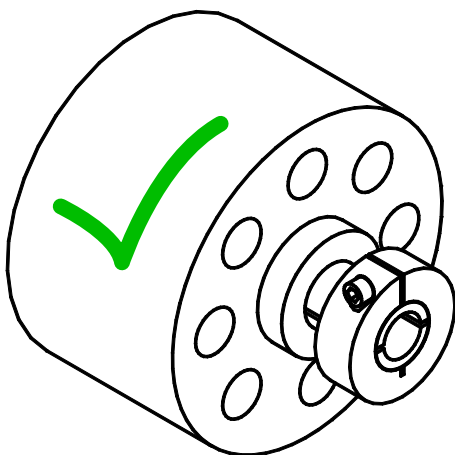
PINCH ROLLER COLLAR INSTALL ORIENTATION



Attachment of the split collar to the pinch roller shaft



Incorrect attachment, causes the split collar to not lock and squeeze the motor shaft.



Correct attachment of the split collar allows the pinch roller to be locked onto the motor shaft. Be sure to place the split collar at the edge of the pinch roller shaft as shown in this diagram.

BALL VIEWING CHUTE ADJUSTMENT and it's RELATIONSHIP to the 90-DEGREE DROP

VIEWING CHUTE & 90 DEGREE DROP ADJUSTMENT:

After setting the machine to the desired speed and trajectory, you must check the angle of the "ball viewing chute". There must be a slope angling downwards towards the wheels (gravity allows the ball to roll towards the wheels). The angle must be steep enough that a ball always rolls towards the wheels. If the machine needs to be pitched higher, the machine will need to tilt backwards, decreasing the angle of the "ball viewing chute" and the balls may not roll to the wheels. After determining the desired speed and trajectory of each machine and adjusting the "ball viewing chute" (to allow for balls to roll down to the wheels) verify that the balls exiting to the "90-degree drop" (after release from the pinch roller) fall into the "ball viewing chute". The ball "drop" should be no less than 3.5 inches for baseball and 4.5 inches for softball. "The 90-degree drop should never be resting inside of or touching the ball viewing chute".

BALL GUIDE CHUTE ALIGNMENT :

1) Turn off the pitching machine (if the wheels are turning) by unplugging the pitching machine AC power cord from the warning light box.

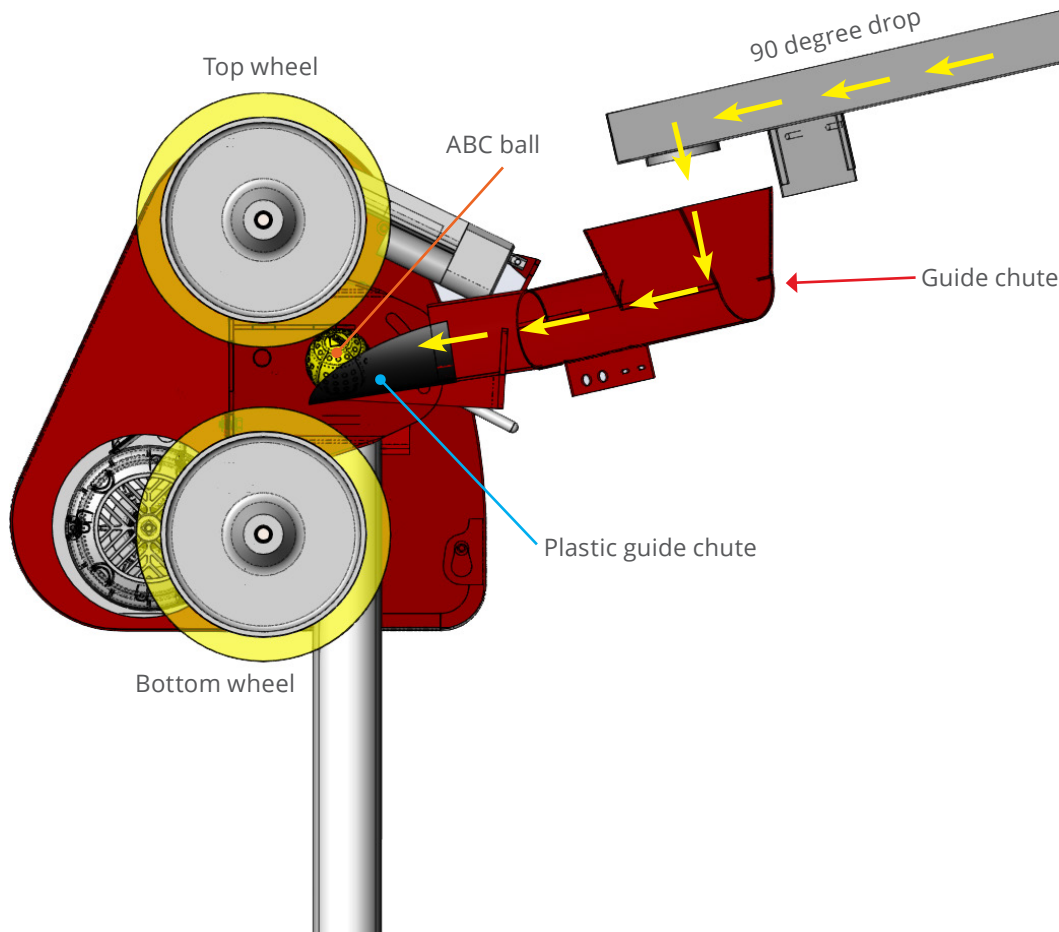
WARNING: Keep loose clothing and long hair away from all moving parts.

2) Drop a baseball in the guide chute.

3) The ball will roll toward the wheels and should stop when in contact with the plastic guide chute and the top wheel.

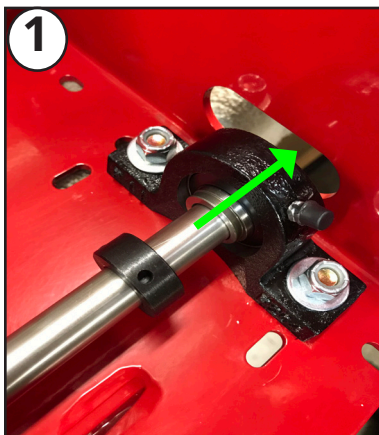
4) The ball should not be touching the bottom wheel at this time, only the top wheel. By turning the top wheel forward, the ball should flex the plastic ball chute downward and then come in contact with the bottom wheel.

5) If the ball is not centered in the plastic ball chute or touches the top and bottom wheel when rolled down the guide, loosen the adjustable hose clamp and adjust the plastic guide chute to the desired location and re-tighten the hose clamp.

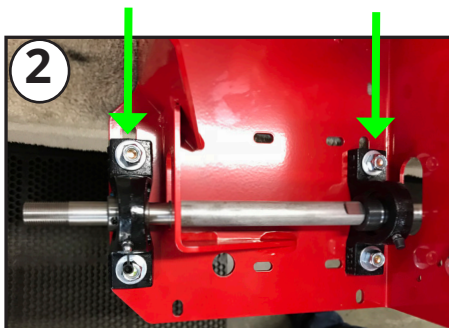


SELF-LOCKING COLLAR DIRECTIONS

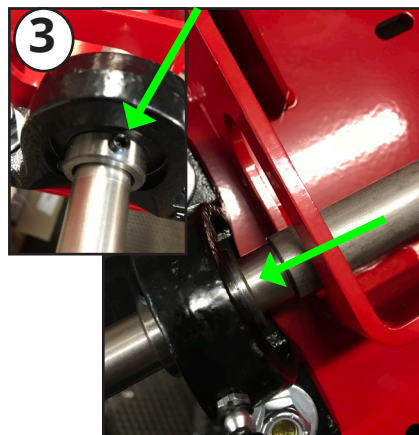
Most pillow block units are equipped with the self-locking collar to facilitate the mounting of wide inner ring bearings. This self-locking collar eliminates the need for locknuts, washers, sleeves and adapters. The locking collar has a counter bored recess which is made purposely eccentric with the bore. The collar recess and the end of the bearing inner ring with which it engages are both machined so that they act as mating cams when on the shaft. When the collar is engaged to the inner ring, it grips the shaft tightly with a positive binding action that increases with use. No adjustments of any kind are necessary.



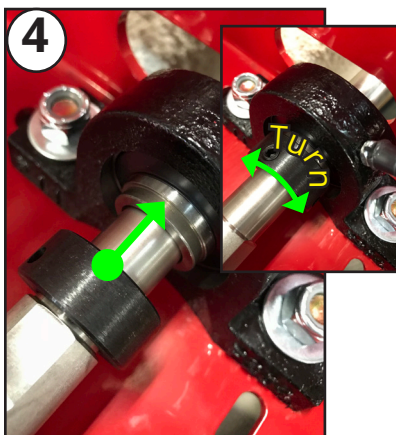
Slip the shaft through the pillow block bearing (belt side bearing). Install the wheel side bearing to the wheel shaft.



Snug-tightening the bearing bolts so you can still adjust the wheel shaft. Once the wheel shaft has been adjusted to the proper measurements fully tighten the bearing mounting bolts.



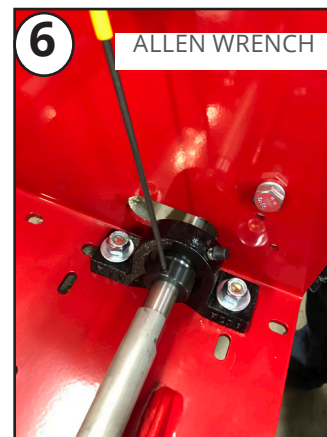
Slide the wheel shaft up against the wheel side bearing inner ring. Tighten the two Allen set screws.



Slide the self-locking collar on the bearing with its cam adjacent to the cam on the end of the bearings inner ring. Turn the collar in the direction of shaft rotation. The eccentric recessed cam will slide over and engage the corresponding cam on the bearing inner ring.



First, lock the wheel shaft in place using a 3/4" open-end wrench. Place the wrench on the portion of the wheel shaft at the provided locking notch. Using a lightweight hammer and drift pin inserted in the drift pin hole, strike in the direction of shaft rotation to positively engage the collar. The wide inner ring is now locked to the shaft.



As a final step, fully tighten the set screw. It exerts a wedging action to hold the collar always in the engaged position, even under shock load. This Fafnir design will operate effectively after the cams are tightly locked in most cases with no setscrew at all.

BATTING CAGE WINTERIZATION

GRAVITY FLOW OR ELECTRIC POWERED SUMP PUMP DRAIN SYSTEM

- 1) Turn power off leading to A/R Conveyor System and pitching machines.
- 2) Place plastic bag over pitching machines and light boxes and tape bottom of bags closed.
- 3) Remove coin mechanism interface from coin boxes and store indoors at room temperature. Place a plastic bag over coin boxes and tape bottom of the bag closed.
- 3) Remove fiberglass shroud, then remove conveyor from sump hole.
- 4) Disconnect and remove AC Speed Controller from pitching machines, store indoors at room temperature. Label each AC Speed Controller so that they can be reinstalled on the same machines they were taken from.
- 5) Netting System: The safest method to protect your net and pipe structure would be to untie the rope lanyards at every perimeter pole and let the net hang straight down from the net collar. Another method that would give you a comfortable degree of safety and save you the job of pulling the net back up in the spring is as follows.
 - a) Tie a piece of net twine to the metal ring in the net, then tie it off to the horizontal rail.
 - b) Untie rope lanyards from perimeter vertical pipe, leaving the untied end of rope resting on the canopy net. This will hold the net in place, yet the single strand of twine would break loose under a heavy load. Upon opening in the spring you would need to re-tie the rope lanyards to the vertical pipes.
- 6) Unplug Computer Display Panel power cord, store display panel inside at room temperature.
- 7) Remove baseballs and softballs, store inside at room temperature.

NOTE: If there is any danger of the batting cage flooding then remove the pitching machines, conveyor and light boxes and store in a safe area.

IMPORTANT NOTE: Inspect release rope attached to hook on Center Pole Collar for damage and wear. Replace rope every 2 years with UV resistant 3/8" truck rope.

DISPLAY PANEL OPERATION MANUAL

CONTENTS IN THIS SECTION

Display panel description and features	page 28
Emergency procedures	page 29
Requesting cage information	page 30
Display panel operating instructions.....	page 31
Free play and auditing time/ball	page 32
Auditing - Game, pause & run	page 33
Auditing - Delete & coin	page 34
Operating modes	page 35
Programming prerequisites	page 36
Programming factory setting, Ball & coin count	page 37
Programming to use Select-A-Pitch	page 38

DISPLAY PANEL OPERATION MANUAL

DISPLAY PANEL DESCRIPTION

Display panel is a microprocessor controlled batting cage computer. It provides control and auditing of 1 to 30 cages from an office.



DISPLAY PANEL FEATURES

- LCD Display.
- Time (15, 30, 45, 60 and 90 minutes) Ball (50,100,150 and 250 balls) "Rentals".
- Run, Pause or Delete all or individual games from the office.
- Machine A or Machine B Rentals.
- Free Play Feature.
- 1 to 30 cages controlled (60 pitching machines).
- Allow monitoring of the remaining balls left to be pitched in any cage at any time.
- Provide a control and auditing system that cannot be circumvented or altered by employees.
- Permit programmable control of the number of balls to be pitched and the number of coins collected per game.
- Allow auditing of the keypad to determine the number of times each function has been used.

DISPLAY PANEL OPERATION MANUAL

EMERGENCY PROCEDURES

The Batting Cage Control System is not designed to be a safety system. It is only designed to provide specific control of batting cages. Safety is the responsibility of the batting cage owners & operators through proper operating procedures.

QUICKLY PAUSE ALL CAGES FROM DISPLAY PANEL

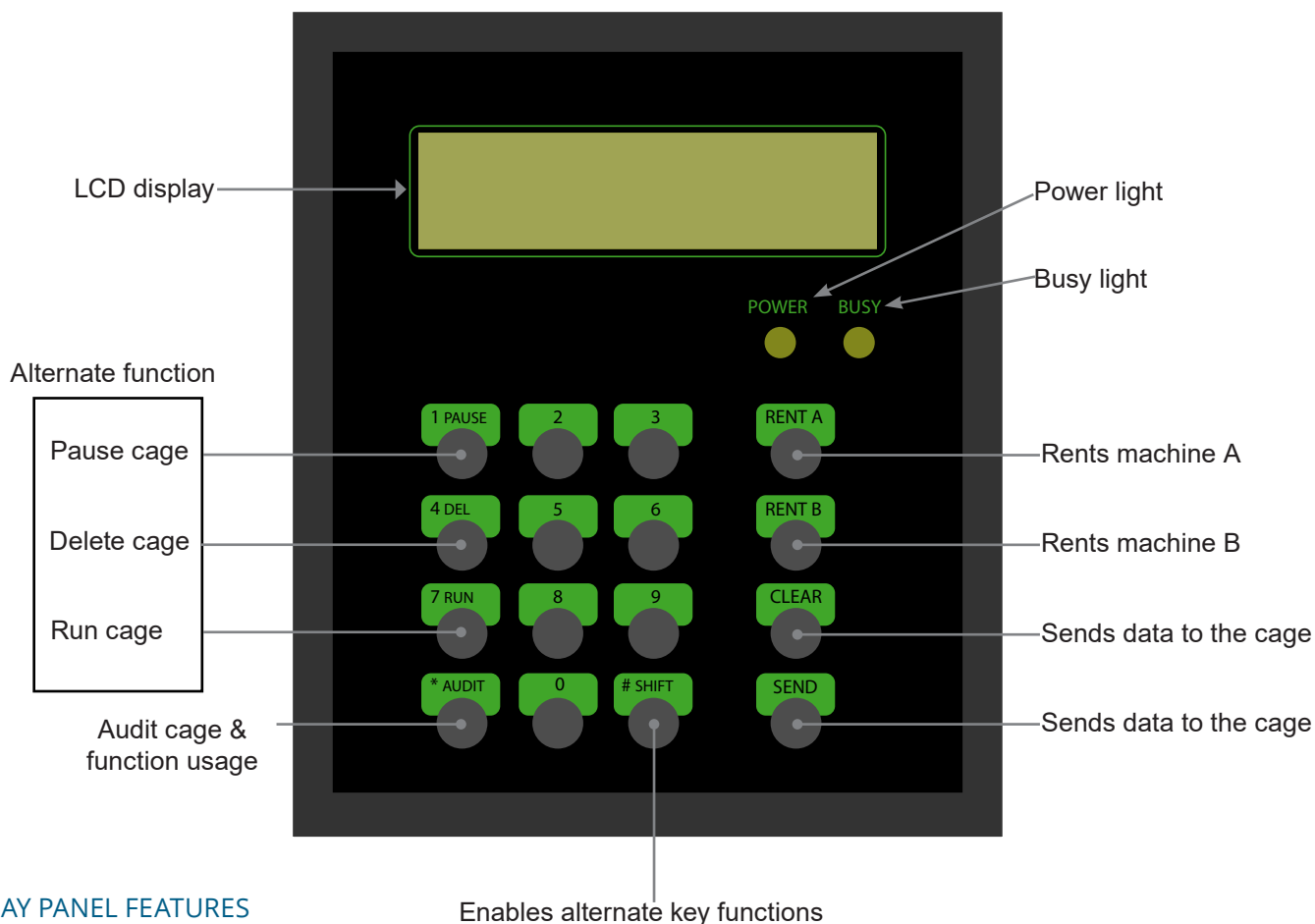
The quickest way to stop all cages is to put them into pause mode.

Press “#”

Press “Clear”

All cages will now be in pause mode. This will give the batting cage operators time to decide which cages to RUN and which cage to DELETE.

Pausing is preferable to deleting because customers do not lose games that they have paid for.



DISPLAY PANEL FEATURES

- *LCD Display.
- *Time (15, 30, 45, 60 and 90 minutes) Ball (50,100,150 and 250 balls) "Rentals".
- *Run, Pause or Delete all or individual games from the office.
- *Machine A or Machine B Rentals.
- *Free Play Feature.
- *1 to 30 cages controlled (60 pitching machines).
- *Allow monitoring of the remaining or the balls left to be pitched in any cage at any time.
- *Provide a control and auditing system that cannot be circumvented or altered by employees.
- *Permit programmable control of the number of balls to be pitched and the number of coins collected per game.
- *Allow auditing of the keypad to determine the number of times each function has been used.

DISPLAY PANEL OPERATION MANUAL

REQUESTING CAGE INFORMATION

To find out the status of any cage:

1. Press "Clear"
2. Enter the cage number "1-30"
3. Press "Send"

The "Busy" light will come on while the computer gets data from the cage.

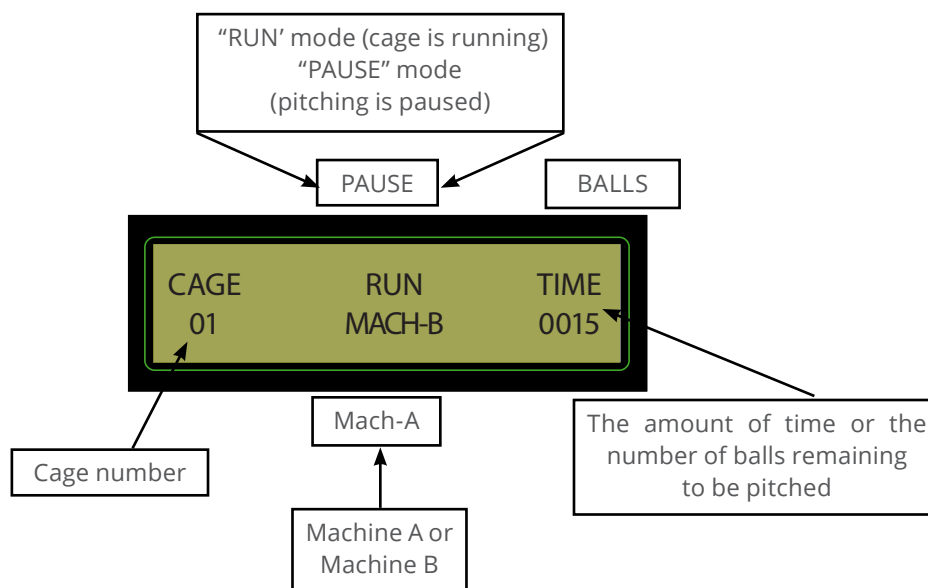
If no cage is connected at that cage number, the display will show.



If the cage is connected and the cage is not being used, the display will show.



THE DISPLAY WILL SHOW ANY OF THE FOLLOWING OPERATING CONDITIONS:



NOTE: The information on the display does not change until new data is requested.

DISPLAY PANEL OPERATING INSTRUCTIONS

NOTE:

- 1) Rent A = Baseball machine Rent B = Softball machine
- 2) When (Cage number) is listed in the sequence press the number of the cage you wish to respond.
- 3) If you get out of sequence, start over by entering "Clear" twice

PAUSE ALL CAGES - "# "Clear"

PAUSE INDIVIDUAL CAGE - "Clear" "Cage number" "# "1" "Send"

RE-START ALL CAGES - "Clear" "0" "# "7" "Send"

RE-START INDIVIDUAL CAGE - "Clear" "Cage number" "# "7" "Send"

DELETE ALL CAGES - "Clear" "0" "# "4" "Send"

DELETE INDIVIDUAL CAGE - "Clear" "Cage number" "# "4" "Send"

MANUAL GAME - "Clear" "Cage number" "Rent A" or "Rent B" "1" "1" "Send"

TIME RENTAL:

Time rentals can be done in 15 minute increments up to a maximum of 90 minutes

MINUTE RENTAL - "Clear" "Cage number" "Rent A" or "Rent B" "Time " "Send"

"Time" - enter "15" (15 minutes), "30" (30 minutes), "45" (45 minutes), "60" (60 minutes), "90" (90 minutes).

BALL RENTAL:

Ball rentals can be done in 50 ball increments up to a maximum of 250 balls.

BALL RENTAL - "Clear" "Cage number" "Rent A" or "Rent B" "Ball " "Send"

"Ball" - enter "50" (50 balls), "100" (100 balls), "150" (150 balls), "200" (200 balls), "250" (250 Balls).

NOTE: Rent A = Baseball machine - Rent B = Softball machine.

TO VIEW THE STATUS OF THE CAGE - "Clear " "Cage number " " Send "

NOTE: If the yellow light is flashing after the game sequence has been entered, "Re-start all cages or Restart individual cage" from the display panel. Pressing the rental button on the side of coin box will also re-start the game.

DISPLAY PANEL OPERATING INSTRUCTIONS

FREE PLAY

Press "Clear"
 Enter "0" for all cages or enter the cage number "1-30"
 Press "#"
 Press "Rent A"
 Enter "1"
 Press "Send"



NOTE: The computer will not indicate the cage number in FREE PLAY.

ENDING FREE PLAY

Press "Clear"
 Enter "0" for all cages or enter the cage number "1-30"
 Press "#"
 Enter "4"
 Press "Send"

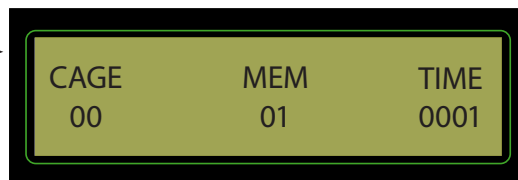


AUDITING - TIME & BALL

TIME
 To find out how many times "15, 30, 45, 60 or 90 minutes" have been rented from the display panel:
 Press "Clear"
 Press "**"
 Enter "1" (15 minutes), "2" (30 minutes), "3" (45 minutes), "4" (60 minutes) or "5" (90 minutes) rentals.

The number displayed under "MEM" is the memory location. The number displayed under "TIME" represents the number of times that this function has been used. In this example we are checking memory location 1 which is for "15 minute time rental". The number under "TIME" shows that this function has only been used once. See figure 1.

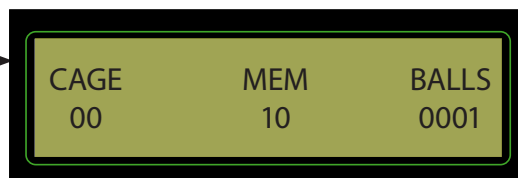
Figure 1 →



BALL:
 To find out how many times "50, 100, 150, 200 or 250 balls" have been rented from the display panel:
 Press "Clear"
 Press "**"
 Enter "6" (50-balls), "7" (100-balls), "8" (150-balls), "9" (200-balls) or "10" (250-balls) rentals.

The number displayed under "MEM" is the memory location. The number displayed under "BALLS" represents the number of times that this function has been used. In this example we are checking memory location 10 which is for "250 ball rental". The number under "TIME" shows that this function has only been used once. See figure 2.

Figure 2 →



DISPLAY PANEL OPERATING INSTRUCTIONS

AUDITING - GAME, PAUSE & RUN

GAME

To find out how many times a game has been rented from the display panel:

Press "Clear"

Press "*"

Enter "11"

The number displayed under "MEM" is the memory location. The number displayed under "GAME" represents the number of times that this function has been used. In this example we are checking memory location 11 which is for "Game Rental"; the number under "GAME" shows that this function has only been used once. See figure 1.



PAUSE:

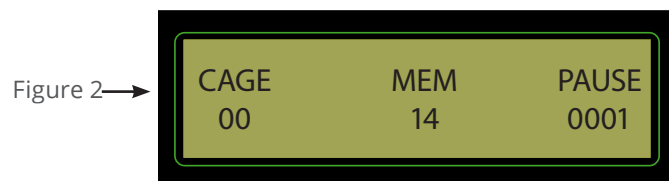
To find out how many times the pause function have been used from the display panel:

Press "Clear"

Press "*"

Enter "14"

The number displayed under "MEM" is the memory location. The number displayed under "PAUSE" represents the number of times that this function has been used. In this example we are checking memory location 14 which is for "Game Pausing"; the number under "PAUSE" shows that this function has only been used once. See figure 2.



RUN

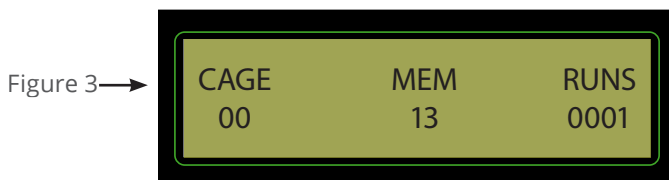
To find out how many times a game has been rented from the display panel:

Press "Clear"

Press "*"

Enter "13"

The number displayed under "MEM" is the memory location. The number displayed under "RUNS" represents the number of times that this function has been used. In this example we are checking memory location 13 which is for "Game Run"; the number under "RUNS" shows that this function has only been used once. See figure 3.



DISPLAY PANEL OPERATING INSTRUCTIONS

AUDITING - DELETE & COIN

DELETE:

To find out how many times the delete function has been used from the display panel:

Press "Clear"

Press "*"

Enter "12"

The number displayed under "MEM" is the memory location. The number displayed under "DEL" represents the number of times that this function has been used. In this example we are checking memory location 12 which is for "Game Deleting"; the number under "DEL" shows that this function has only been used once. See figure 1.

Figure 1 →

CAGE	MEM	DEL
00	12	0001

COIN:

To find out how many coins have been dropped into a cage:

Press "Clear"

Press "*"

Enter "16"

Enter the cage number "1-30"

Press "Send"

To find out how many coins have been dropped into another cage repeat steps 4 and 5. To exit from Auditing mode press "C." The number displayed under "MEM" is the memory location. The number displayed under "CAGE" represents the cage number. The number displayed under "COINS" shows the number of coins that have been dropped into this cage. In this example we are checking memory location 16 which is for "COINS"; the number under "CAGE" shows that we are checking Cage 1, and the number under "COINS" shows that only one coin has been dropped into this cage. See figure 2.

Figure 2 →

CAGE	MEM	COINS
01	16	0001

DISPLAY PANEL OPERATING INSTRUCTIONS

OPERATING MODES

Mode	Description (The Baseball System has the following features that can be set or cleared)	Set	Cleared
0	This mode affects how a baseball or softball is selected in a Time Rental. If this mode is set, baseball or softball is selected with the "Run/Start" button. If this mode is cleared, baseball or softball is selected with a coin drop.	1	0
1	Mode 1 and Mode 2 affect how a baseball or softball game is selected and run in a Game Rental. If this mode is set, baseball or softball is selected with a coin drop and activated with a "Run/Start" button. If this mode is cleared, Mode 2 is enabled.	2	0
2	NOTE: This mode is only enabled if Mode 1 is cleared. Mode 1 and Mode 2 affect how a baseball or softball game is selected and run in a Game Rental. If this mode is set, baseball or softball is selected and run with the "Run/Start A" or "Run/Start B" button. If this mode is cleared, baseball or softball is selected and run with a coin drop.	4	0
3	If this mode is set, the light box does not go into the "pause" mode after a game has been pitched. Mode 7 should be cleared.	8	0
4	This mode tells the computer if there is only one machine at this cage. If this mode is set, "B" rental is enabled. If this mode is cleared, "B" rental is disabled.	16	0
5	This mode enables or disables missing ball shutdown. If this mode is set, the cage changes to the "pause" condition when no ball is pitched within 1 minute. Pitching can be resumed by pressing the "Run/Start" button.	32	0
7	This mode enables or disables the accumulation of coins after run/start is activated. If this mode is set, multiple games can be rented by dropping in multiple coins after run/start button is activated. If this mode is cleared, multiple games can only be rented until run/start is activated; any more coins dropped in after run/start is activated do not accumulate games.	128	0

These modes are programmed into the computer by adding the mode numbers. For example, if modes 0 and 2 are cleared and modes 1, 4, 5 and 7 are set, the operating number is 178.

NOTE: Disconnect all cages from line except the cage you are going to program otherwise any cage connected to the line will have its mode changed also.

NOTE: Balls/vend and Coins/vend will have to be re-entered after setting the modes.

Mode 0 disabled	0
Mode 1 disabled	2
Mode 2 disabled	0
Mode 4 enabled	16
Mode 5 enabled	32
Mode 7 enabled	+128
Operating Number	178

To change the warning lights brightness:

1. Enter "254"
2. Press "Rent A"
3. Enter the level of brightness (0-255)
4. Press "Rent B"
5. Press "Send"

Settings:

1 to 128 → Dimming Range
129 to 255 → Full Brightness

Warning Light Brightness - This setting allows you to change the level of brightness of the warning lights.

To change the operating mode:

1. Enter "255"
2. Press "Rent A"
3. Enter the operating number (0-255)
4. Press "Rent B"
5. Press "Send"

To change the operating mode:

1. Enter "255"
2. Press "Rent A"
3. Enter the operating number (0-255)
4. Press "Rent B"
5. Press "Send"

NOTE: Balls/Coins will have to be re-entered after setting the mode and the warning light brightness. Exiting Program Mode: (Press "#" to exit from the programming mode.)

PROGRAMMING PROCEDURES

BEFORE PROGRAMMING:

NOTE: All programming must be done from the light box of stall needing to be programmed.

1) Connect Light box to power (115 VAC)

2) Open light box door to access the Circuit Board.

NOTE: If this is not your "Master Cage", you will need to install the blue jumper clip on both prongs before proceeding. Make sure Master Control (Blue) jumper clip is connected to both pins on circuit board.

3) Unplug low voltage cables from both SIO 2 phone jacks.

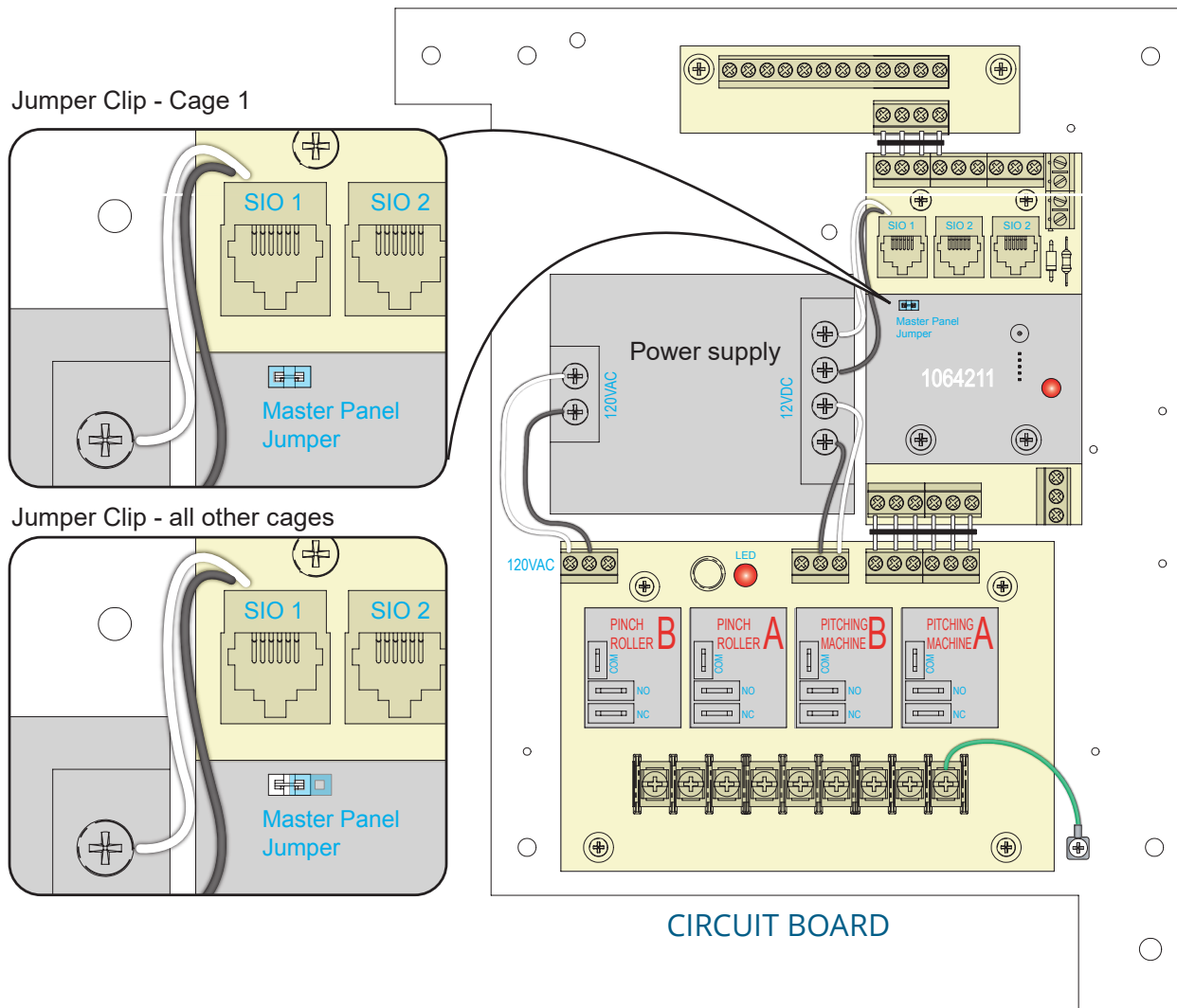
4) Plug the display panel into either SIO2 phone jacks.

5) Verify computer panel power light is on.

6) Proceed to Programming Procedures

7) After programming is complete remove (Blue) jumper clip and re-attach to only 1 pin on the circuit board, then reconnect both low voltage cables into the SIO2 phone jacks of the circuit board.

NOTE: The ball count switch of the cage that you want to program must be activated during programming. This can be accomplished by holding down the ball count micro switch. Any cage that has the ball switch activated will have its cage number changed also.



PROGRAMMING FACTORY SETTING, BALL & COIN COUNT

NOTE: The ball switch of the cage that you want to program must be activated during programming. This can be accomplished by holding down the ball count micro switch. Any cage that has the ball switch activated will have its cage number changed also.

(STEP 1) "REPROGRAM FACTORY DEFAULT SETTINGS"

Press "Clear "
Enter "3" "1" "
Enter "1" "2" "3" "4"
Enter "2" "5" "5"
Press "Rent A"
Enter one of the following "1" "7" "6" - For a standard coin box or a single machine with card reader.
"1" "7" "7" - For a stand alone S.A.
"1" "8" "1" - For a dual machine with card reader.
Press - "Rent B"
Activate the ball count micro switch
Press - "Send"
Deactivate the ball count micro switch
Press - "#"

(STEP 2) "PROGRAM CAGE NUMBER"

Press "Clear"
Enter "3" "1"
Enter "1" "2" "3" "4"
Press "Clear"
Enter the cage number "1-30"
Press " * "
Activate and hold the ball count micro switch
Press "Send"
Deactivate the ball count micro switch
Press "#"

(STEP 3) "PROGRAM THE BALL & COIN COUNT"

Press "Clear "
Enter "3" "1"
Enter "1" "2" "3" "4"
Enter the number of coins required to start a game "1 - 100"
Press "Rent A"
Enter the number of balls per game "1 - 255"
Press "Rent B"
Press "Send"
Press "#"

PROGRAMMING TO USE SELECT-A-PITCH

IF YOU HAVE A SELECT-A-PITCH SYSTEM, YOU MUST PROGRAM EACH LIGHT BOX CIRCUIT BOARD FOR USE WITH SELECT-A-PITCH. THIS MUST BE DONE IF YOU ADD A SELECT-A-PITCH SYSTEM, REPLACE THE PT-8 CIRCUIT BOARD, OR IF THE CIRCUIT BOARD HAS LOST IT'S MEMORY.

NOTE: The ball switch of the cage that you want to program must be activated during programming. This can be accomplished by holding down the ball count micro switch. Any cage that has the ball switch activated will have its cage number changed also.

"PROGRAM TO USE SELECT-A-PITCH"

Press "Clear "
 Enter "3" "1"
 Enter "1" "2" "3" "4"
 Enter "2" "4" "5"
 Press "Rent A"
 Enter one of the following "2" "1" for a BASEBALL ("A" side relays) Select-A-Pitch.
 "2" "6" for a SOFTBALL ("B" side relays) Select-A-Pitch.
 "3" "1" for a DUAL Select-A-Pitch.
 Press "Rent B"
 Activate and hold the ball count micro switch
 Press "Send"
 Deactivate the ball count micro switch
 Press "#"

"REPROGRAM TO REMOVE SELECT-A-PITCH"

Press "Clear "
 Enter "3" "1 "
 Enter "1" "2" "3" "4"
 Enter "2" "4" "5"
 Press "Rent A"
 Enter "0"
 Press - "Rent B"
 Activate the ball count micro switch
 Press - "Send"
 Deactivate the ball count micro switch
 Press - "#"

NOTE: After programming the setting to use or remove Select-A-Pitch, the ball & coin count must be reprogrammed.

SELECT-A-PITCH SYSTEM

CONTENTS IN THIS SECTION

SELECT-A-PITCH introduction.....	page 40
SELECT-A-PITCH daily start up procedures.....	page 41
Programming ball speed.....	page 42
Programming fast pitch softball speed.....	page 43
Enter elevation programming mode.....	page 44
Elevation programming procedure	page 45
Starting a SELECT-A-PITCH game	page 46

SELECT-A-PITCH INTRODUCTION

The Select-A-Pitch System is designed for baseball and softball fast pitch machines only, and allows the customer to select from three different speeds. The batter can independently select the best height setting for that individual. This is achieved with a specially designed and modified pitching machine, a speed & height control box mounted on the coin box or card reader (see Figure below) a left hand hitter height control box (see Figure 2), an actuator and PT-8 electronics.

Baseball machines are available in two different speed ranges that can be programmed. The "Slow" range program will allow 3-set pitching speeds of 40, 50, and 60 MPH. The "Fast" range program will allow 3-set pitching speeds of 50, 60, and 70 MPH.

Fast pitch Softball machines are programmed to 40, 50, and 60 MPH.



SELECT-A-PITCH DAILY STARTUP PROCEDURES

"DAILY START-UP PROCEDURE USING COIN BOX"

- 1) Activate game by dropping coin into "Baseball" or "Softball" coin slot of token box.
- 2) Select desired speed.
- 3) Wait for elevation light to stop moving then press "Start".

NOTE: If balls are pitching at desired height, the machine is programmed properly.

NOTE:

If machines are not throwing at the desired height, unplug light box from power and then reconnect. Proceed with the above steps to verify machine is pitching at desired height. If pitches are still not accurate, calibrate the elevation as described in the "Elevation Programming Instructions" section of your manual.

"DAILY START-UP PROCEDURE USING CARD READER BOX"

- 1) Activate game by swiping card through card reader
- 2) Select "Baseball" or "Softball" from the two button push panel in card reader box
(this step only required if there is both baseball and softball machines in the stall)
- 3) Select desired speed from Select-A-Pitch control box
- 4) Wait for elevation light to stop moving then press "Start".

NOTE: If balls are pitching at desired height, the machine is programmed properly.

NOTE:

If machines are not throwing at the desired height, unplug light box from power and then reconnect. Proceed with the above steps to verify machine is pitching at desired height. If pitches are still not accurate, calibrate the elevation as described in the "Elevation Programming Instructions" section of your manual.

PROGRAMMING BASEBALL SPEED

NOTE:

If this is a dual select a pitch system you must disconnect the "SOFTBALL" speed interface + (red wire) from the PT-8 circuit board before you start. Failure to disconnect the + (red wire) of the softball speed interface prior to programming will result in the softball speeds being reprogrammed.

40 MPH CODE	50 MPH CODE	60 MPH CODE
"Clear"		
"3" "1"		
"1" "2" "3" "4"		
"2" "1" "2"	"2" "1" "3"	"2" "1" "4"
"Rent A"	"Rent A"	"Rent A"
"2" "4" (Speed value)	"3" "6" (Speed value)	"4" "7" (Speed value)
"Rent B"	"Rent B"	"Rent B"
Hold down ball count micro switch	Hold down ball count micro switch	Hold down ball count micro switch
"Send"	"Send"	"Send"
Release ball count micro switch	Release ball count micro switch	Release ball count micro switch
Proceed to 50 MPH code	Proceed to 60 MPH code	"#" to exit programming

50 MPH CODE	60 MPH CODE	70 MPH CODE
"Clear"		
"3" "1"		
"1" "2" "3" "4"		
"2" "1" "2"	"2" "1" "3"	"2" "1" "4"
"Rent A"	"Rent A"	"Rent A"
"3" "6" (Speed value)	"4" "7" (Speed value)	"5" "9" (Speed value)
"Rent B"	"Rent B"	"Rent B"
Hold down ball count micro switch	Hold down ball count micro switch	Hold down ball count micro switch
"Send"	"Send"	"Send"
Release ball count micro switch	Release ball count micro switch	Release ball count micro switch
Proceed to 50 MPH code	Proceed to 60 MPH code	"#" to exit programming

PROGRAMMING FAST PITCH SOFTBALL SPEED

NOTE:

If this is a dual select a pitch system you must disconnect the "BASEBALL" speed interface + (red wire) from the PT-8 circuit board before you start. Failure to disconnect the + (red wire) of the baseball speed interface prior to programming will result in the baseball speeds being reprogrammed.

40 MPH CODE	50 MPH CODE	60 MPH CODE
"Clear"		
"3" "1"		
"1" "2" "3" "4"		
"2" "1" "2"	"2" "1" "3"	"2" "1" "4"
"Rent A"	"Rent A"	"Rent A"
"1" "6" (Speed value)	"2" "8" (Speed value)	"4" "5" (Speed value)
"Rent B"	"Rent B"	"Rent B"
Hold down ball count micro switch	Hold down ball count micro switch	Hold down ball count micro switch
"Send"	"Send"	"Send"
Release ball count micro switch	Release ball count micro switch	Release ball count micro switch
Proceed to 50 MPH code	Proceed to 60 MPH code	"#" to exit programming

NOTE:

You must program the ball and coin count when done with the speed configuration programming.

"PROGRAM THE BALL & COIN COUNT"

Press "Clear "
Enter "3" "1"
Enter "1" "2" "3" "4"
Enter the number of coins required to start a game "1 - 100"
Press "Rent A"
Enter the number of balls per game "1 - 255"
Press "Rent B"
Press "Send"
Press "#"

ENTER ELEVATION PROGRAMMING MODE

(TO ENTER PROGRAM ELEVATION MODE FOR "ALL MACHINES" FROM THE DISPLAY PANEL)

Press "Clear"
Enter "3" "1"
Enter "1" "2" "3" "4"
Enter "2" "0" "1"
Press "Rent A"
Enter "1" "0" "1" for BASEBALL MACHINES or "1" "0" "2" for SOFTBALL MACHINES
Press "Rent B"
Press "Send"

NOTE:

The light box is now in elevation programming mode. The red & yellow LED lights on the light box should be flashing. Proceed to elevation programming procedure on page 5.

(TO ENTER PROGRAM ELEVATION MODE FOR A SINGLE "BASEBALL" MACHINE FROM THE DISPLAY PANEL)

Press "Clear"
Enter "3" "1"
Enter "1" "2" "3" "4"
Enter "2" "0" "1"
Press "Rent A"
Enter "2" "0"
Enter the cage number "1 - 30"
Press "Rent B"
Press "Send"

NOTE:

The light box is now in elevation programming mode. The red & yellow LED lights on the light box should be flashing. Proceed to elevation programming procedure on page 5.

(TO ENTER PROGRAM ELEVATION MODE FOR A SINGLE "SOFTBALL" MACHINE FROM THE DISPLAY PANEL)

Press "Clear"
Enter "3" "1"
Enter "1" "2" "3" "4"
Enter "2" "0" "1"
Press "Rent A"
Enter "1" "5"
Enter the cage number "1 - 30"
Press "Rent B"
Press "Send"

NOTE:

The light box is now in elevation programming mode. The red & yellow LED lights on the light box should be flashing. Proceed to elevation programming procedure on page 5.

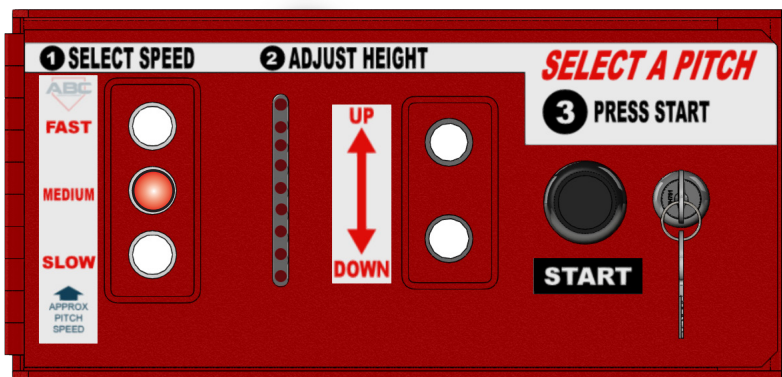
ELEVATION PROGRAMMING PROCEDURE

This procedure must be performed when the system is first installed, if the elevation actuator is replaced, if the memory has been lost, or if the center height of pitch needs to be adjusted. After entering elevation programming mode from the computer display panel (see instructions on previous page) follow the below steps to set the center height of pitch.

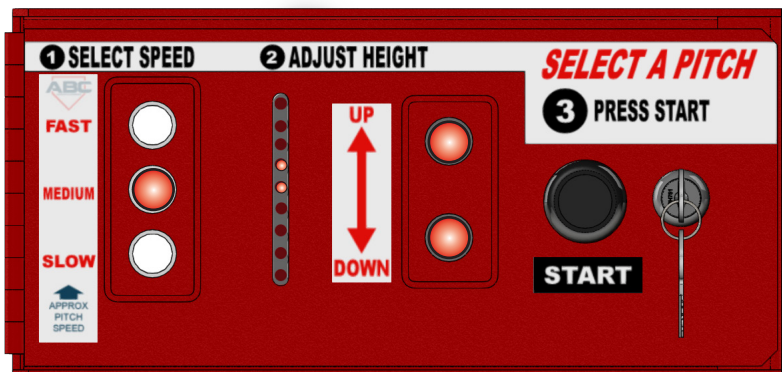
1) Select the “Speed” you want to configure elevation for.

NOTE:

Need to wait for the elevation LED light to stop moving before proceeding to step 2.



2) Press the “Down” button and while holding the “Down” button press the “Up” button, then release both buttons at the same time. Elevation buttons will turn solid and the elevation height position lights will flash and pitching machine will start.



3) Wait for height indicator lights to stop moving, there may be a brief pause before the lights begin to start moving. Once the height indicator lights stop moving balls will begin to pitch. If height indicator lights do not move or flash then start over at step 1.

4) Adjust the pitching height by pressing the “Up” or “Down” button. Continue pressing the appropriate button until desired height is achieved.

NOTE:

When making adjustment, disregard height indicator light position. If the height indicator light goes to the top or bottom, continue to press button until desired height is achieved. Any interruption in the adjustment process will cause the balls to stop pitching. Wait 5 seconds and balls will begin pitching again.

5) When desired height of pitch is achieved press the “Start” button once to save and move to next speed.

6) Repeat steps 1 through 5 for each speed you would like to calibrate, if you are done calibrating press the “Start” button twice to exit programming mode.

NOTE:

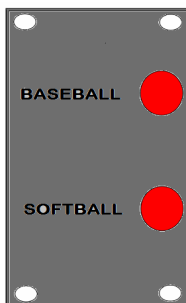
The system will time out after 60 seconds if there’s no activity from the elevation panel, if this happens press the “Start” button once and start over.

STARTING A SELECT-A-PITCH GAME

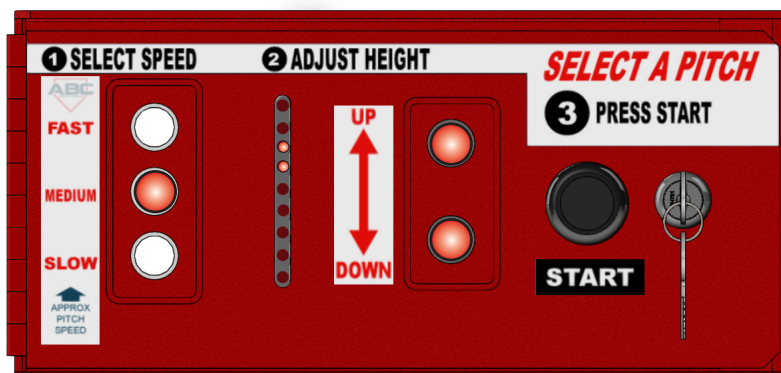
1) Drop token in either “Baseball” or “Softball” slot of coin box OR swipe card if using card readers.

NOTE: This step is only for card readers with dual machines, if using tokens proceed to step 3)

2) Select either “Baseball” or “Softball” from the 2 button panel located on the card reader box.



3) Press the desired Speed button (Speed buttons turn solid and Elevation buttons begin flashing, the height indicator light will automatically self center for each speed)

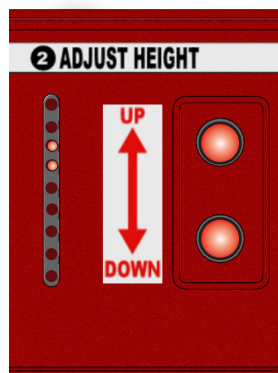


4) Press the “Start” button, the yellow LED on light box will turn solid yellow and 8 seconds later the red LED on light box will turn on . Once the light box red LED light turns on BALLS WILL START PITCHING.

5) Press the “Up” or “Down” button until pitch height is at desired location. The height indicator light will move each time the “Up” or “Down” button is pressed.

NOTE:

Batter can adjust height of pitch anytime during the game, but speed can only be changed at the start of a new game.



TROUBLESHOOTING

CONTENTS IN THIS SECTION

Troubleshooting introduction	page 48
Troubleshooting - Display panel	page 49
Troubleshooting - Coin box	page 51
Troubleshooting - Light box	page 52
Troubleshooting - Pitching machine.....	page 56
Troubleshooting - Automated conveyor system.....	page 58
Troubleshooting - Automated conveyor system & Hopper agitating system	page 58
Troubleshooting - Light box warning lights & circuit board controller block error code guide.....	page 60
KB Electronics - Return Authorization Form.....	page 61
Phenix Controls - Return Authorization Form.....	page 62

TROUBLESHOOTING INTRODUCTION

WARNING: EMPLOYEES SHOULD ALWAYS WEAR A BATTING HELMET WITH FACE GUARD AND SOUND A WARNING FOR BATTERS TO LEAVE BATTING STALLS DURING MAINTENANCE OF EQUIPMENT. THIS EQUIPMENT SYSTEM HAS SEVERAL MOVING PARTS AND HIGH VOLTAGE PRESENT WHICH POSE POTENTIAL DANGER TO ANY PERSON SERVICING OR MAINTAINING IT. BEFORE SERVICING OR MAINTAINING EQUIPMENT SYSTEM, YOU MUST REVIEW “MAINTENANCE” SECTION OF THIS MANUAL. SERIOUS INJURIES COULD RESULT IF NOT REVIEWED, UNDERSTOOD AND FOLLOWED!

This introduction is an explanation of how ABC's Batting Range System (A Division of J&J Amusements) works from the initiation of the game to the completion of the game.

DISPLAY PANEL

The Display Panel control panel provides control and auditing of your batting cage. The control panel has an adjustable program which enables the operator to set any coin, time and ball amount he/she decides to use for the range. Please refer to the DISPLAY PANEL owners manual for operating instructions.

COIN BOX

The coin box and coin mechanism are linked to the light box via the Belden (low voltage) control cables. The coin mechanism provides an input to the light box which then activates the corresponding lights, pitching machine motor and pinch roller motor. This is achieved through a very simple process. The coin mechanism has two wires attached to its microswitches and coin mechanism interface, one wire carries a signal, the other is ground. When the coin drops through the coin mechanism and deflects the wire on the microswitch the signal is sent to the light box. The light box recognizes this as an “input/signal” and begins the process of starting a game.

LIGHT BOX

The light box is the device which directs several functions of the batting cage; the pitching machine motor, warning lights, pinch roller motor and agitator motor all receive their operating current from the controller block located on the circuit board. The light box is activated by a signal sent from the Coin box. The light box will operate until the number of balls has been pitched or the game deleted. The ball count microswitch (attached to the pitching machine ball chute) provides “inputs/signals” (pitched balls) to the controller block. When the programmed amount of pitched balls (“input/signal”) are received by the controller block, the signal is discontinued and all functions of the cage stop (except for the pitching machine). The pitching machine will continue to run for approximately 5 - 10 minutes, but no balls will be pitched until a new game is activated at the coin box or manually at the display panel.

I.H.S. Systems use the SA-8 circuit board “inside” the light box is the brain of your I.H.S auto feeding pitching machine. The logic, or “thinking abilities” of the SA-8 circuit board will determine when the cages begin operation and the type of game to be played, (i.e. coin activated, manually activated or rental activated game). The SA-8 circuit board has an adjustable program which enables the operator to set any coin, time and ball amounts he or she decides to program.

The SA-8 circuit board has two positions or modes of operation, these are 1) stand-alone 2) display panel computer type.

1) Stand-alone mode - enables you to operate each machine individually, (i.e. coin & ball count).

2) Display panel mode - enables you to operate all I.H.S pitching machines through “one” master unit. NOTE: This feature can only be used upon purchase of ABC's MP04A1 Computer Control Panel. Call J&J for further information.

PITCHING MACHINE

The pitching machine is the heart of the batting range. Maintenance, servicing, and operating instructions are described throughout the various sections of this manual. The principle behind the pitching of the ball is simply based on the RPM's of the wheels (or wheel) and the amount of “pinch” on the ball. The two wheels rotate in the opposite directions and at different RPM's to create the proper “backspin” on the ball. The velocity of the pitch is achieved when a ball is pinched between the wheels and is accelerated by the rotating wheels.

AUTOMATIC CONVEYOR SYSTEM

The Automatic conveyor system's function is to collect the balls, carry them up to the hopper level, sort the baseballs from the softballs and deliver them to the ball chutes. The conveyor drive motor rotates the top conveyor pulley, which drives the conveyor belt. Both the baseball and the softball hoppers have an “Agitator disc” that agitates the balls with its rotating action. Each hopper agitator disc is driven by an electric motor. After falling into the hoppers, the balls leave through the exit holes and roll down the ball chutes.

TROUBLESHOOTING - DISPLAY PANEL

IMPORTANT TROUBLESHOOTING INFORMATION

In order to effectively troubleshoot a problem in your batting range, you must first determine where the problem is located. In most cases, a problem will develop because of a component failure or a bad electrical connection. The first step, in all cases, will be to look at your master office control panel to see if the game has registered in that particular cage. If the game has registered, proceed to the Light Box Section of this guide. If it does not register on the display panel proceed to the Coin Box Section.

THE SEQUENCE OF A NORMAL GAME IS:

- A) The game is activated either by coin, card swipe or "manually" through the display panel.
- B) The pitching machine and the yellow light of the light box are activated.
- C) The red light and pinch roller begin to operate, balls begin to pitch.
- D) After the programmed amount of balls have been thrown, all functions stop except the pitching machine. No balls will be thrown, but the pitching machine will continue to run for approximately 5 - 10 minutes on the "off delay" cycle.

I. DISPLAY PANEL

PROBLEM	SOLUTION
As I enter a function into the Display Panel the display changes, erasing all the information that I have entered.	The Light box is sending data i.e. balls left or time remaining to the Display Panel and it is overwriting the entered information. Pressing the "Clear" button before you enter a function will stop the cage from sending data.
Incorrect or unusual information is displayed on the Display Panel.	The Light box and the Display Panel are sending data at the same time. Press the "Clear" button and re-send the computer data.
Why can't I rent any ball or time amount that I want.	Allowing any ball or time amount to be entered cannot be stored in auditing. This prevents your customers from getting less or more time or balls than what they paid for.
Nothing happens when I "START/RUN" a game.	"RUN" will only work if the cage is in "PAUSE." If the computer does not show "PAUSE" when you check the cage status, then "RUN" will not work. Rent a game first, then use "RUN."
When you "Rent" a game longer than 60 min. the machine shuts down before the time is up.	The abandoned game timer is 5 minutes. If no action happens in 5 minutes, the game is deleted. Free play does not affect this timer, free play just allows the game to start with the start button instead of needing a coin drop.
Machine pitches 3 or 4 balls and then the yellow LED light on light box starts flashing and pinch roller turns off.	Light box has gone into "pause" mode check for: A) Balls are stuck in the trough and not getting to the ball count microswitch. B) Defective ball count microswitch C) Whisker wire on ball coin microswitch is not bent high enough.

TROUBLESHOOTING - DISPLAY PANEL

PROBLEM	CAUSE	SOLUTION
Display Panel will not power up.	1a) No power at the outlet If there is power at outlet move to *1e.	Check circuit breaker for the light box outlet that's being used for the master control. (This will be the light box that has a blue jumper clip on both pins of the circuit board controller block).**See circuit board diagram on page 21**
	1b) No power "120VAC" at light box terminal strip.	Check for 120VAC between "black" and "white" wires located at the bottom right of the terminal strip. If no power, check power cord and cord end.
	1c) No power at primary side of power supply. (2 wire side).	If there is no 120VAC at primary side (2 wire side) of the power supply, repair or replace the circuit board power supply.
	1d) No power at the secondary side of the transformer (4 terminal side).	If there is 120VAC at primary (2 wire side) section but no 12VDC from secondary (4 terminal side) section, replace power supply.
	1e) Master control light box is not plugged into the outlet.	Verify master control light box is plugged in.
	1f) Blue jumper clip is not installed on circuit board control block.	A) Verify the master control light box has the blue jumper clip installed on both pins of the circuit board control block. B) Verify the blue jumper clip is only on one pin of all the other light box circuit board controller blocks.
	1g) Communication line from display panel to the master control light box is plugged in wrong.	Verify communication line is plugged into the SIO2 computer jack of the master control light box circuit board.
	1h) Communication line from display panel to master control light box is bad.	A) Take display panel down to master control light box and plug directly into SIO2 computer jack of the circuit board to verify panel powers up. B) If display panel does not power up when plugged into the light box SIO2 port, verify the blue jumper clip is connected to both pins of the control block and only the coin and display panel communication lines are connected. C) Connect the display panel to any other light box circuit board and follow steps "A" & "B" above. D) If the display panel still will not power up, call J&J service department to receive an RMA number for Phenix repair. See Phenix repair instruction on page 62 for details.
	1i) Communication line from display panel to light box is bad.	Check terminal connectors on the communication line, check the line for cuts, repair or replace line if needed.

TROUBLESHOOTING - COIN BOX

PROBLEM	CAUSE	SOLUTION
The customer inserts a token into coin mechanism and it does not register on the display panel.	1a) Token in coin return	Pull token out of coin return and try again.
	1b) Token stuck in coin mechanism	Open coin mechanism gate and remove stuck token.
	1c) Wire whisker on coin mechanism micro switch needs adjustment.	If a coin is not registering, bend the wire in a manner to make it longer. If multiple counts are registering from one coin, bend the wire in a manner to make it shorter.
	1d) Defective coin mechanism micro switch.	Unplug the two wires connected to the micro switch and touch them together then release, if nothing registers on display panel call ABC (A Division of J&J Amusements).
	1e) Wire in coin box is bad.	Inspect wire going to micro switch for nicks, cuts, or pinches. Repair as needed.
When a game is in rent (time) mode. Customer pushes "start/rent" button on coin box but game does not activate.	2a) Defective "start/rent button" on coin box.	Remove wires from start/rent button and touch together. If this works then replace the start/rent button.
	2b) Defective "coin mech. interface".	Check for 3.5 - 5.5VDC on coin mech. interface between "run" and "ground" screw. If 3.5 - 5.5VDC is not present, coin mech interface will need to be replaced.

TROUBLESHOOTING - LIGHT BOX

PROBLEM	CAUSE	SOLUTION
Token inserted in coin box, all components begin operation except "yellow light".	1a) Controller block memory is scrambled.	Re-program controller using factory default settings.
	1b) No triggering voltage to yellow "LED" light from "Controller Block".	Check for 6 - 9VDC (light off) on the circuit board "LED yellow" terminal block connector. Check for .8 - 1.5VDC (light on) on the circuit board "LED yellow" terminal block connector.
	1c) Defective yellow "LED" light	Replace yellow "LED" light.
	1d) Bad light box ground	Repair ground connections.
	1e) "LED" wire harness is bad	Check wires for loose connections, nicks or frayed wires. Repair or replace as needed.
	1f) Defective controller block	Repair or replace circuit board controller block.
Token inserted, all components begin operation except pitching machine.	2a) No power to pitching machine. To isolate the problem, unplug light box and plug pitching machine directly into an outlet. If the motor runs, plug pitching machine back into the light box and proceed to *2d.	If pitching machine does not run check the power cord for bad connection or damage. Repair or replace as needed.
	2b) Bad connection at AC speed controller.	Verify the yellow cord connector has not become loose or damaged. Repair or replace the yellow cord as needed.
	2c) Bad Ac speed controller or machine motor.	To verify if it's a faulty AC speed controller, connect a spare controller or one from a known working cage into this motor. If the motor works then the AC speed controller is the issue. If the motor still will not turn on then the motor is the issue. Replace as needed.
	*2d) Pitching machine power cord is unplugged or not plugged in correctly.	Verify the cord from the pitching machine AC drive is plugged into the correct light box plug. "Pitching machine "A" cord to light box "A" cord" "Pitching machine "B" cord to light box "B" cord"
	2e) Controller block memory is scrambled.	Re-program controller using factory default settings.
	2f) Loose wire on machine pigtail cord coming from light box.	Remove female end of plug and check for loose wires.
Continued on next page		

TROUBLESHOOTING - LIGHT BOX

PROBLEM	CAUSE	SOLUTION
<i>**Continued from previous page**</i>	2g) Defective machine relay.	Repair or replace relay circuit board.
Pinch roller begins operating when light box is plugged into the outlet. No lights are on.	3a) Defective feed relay.	Repair or replace relay circuit board.
	3b) Defective controller block	Repair or replace circuit board controller block.
Game has ended, lights go out, pinch roller stops, but pitching machine continues to run after the 5 minute "off delay" time.	4a) Defective controller block	Repair or replace circuit board controller block.
	4b) Defective machine relay.	Repair or replace relay circuit board.
Token inserted and both lights come on at the same time.	5a) Defective controller block	Repair or replace circuit board controller block.
Pitching machine runs as soon as light box is plugged into power. No lights come on.	6a) Defective controller block	Repair or replace circuit board controller block. See page 62 for repair details.
	6b) Defective machine relay.	Repair or replace relay circuit board. See page 62 for repair details.
Token inserted in coin mechanism, but the game does not begin. No lights come on.	7a) No power "120VAC" at light box terminal strip.	Check for 120VAC between "black" and "white" wires located at the bottom right of the terminal strip. If no power, check power cord and cord end. If no power is present, check circuit breaker at the service panel.
	7b) Controller block memory is scrambled.	Reprogram coin and ball count.
	7c) Communication line is bad.	Check for 12VDC on circuit board SIO1 Coin line, then verify you have 12VDC at the coin mech interface + and -.
	7d) Defective coin mech interface	Remove white (and red if dual cage) wires from coin mech interface. Check for 12VDC on coin mech interface + and -, then verify you have 3.5 - 5.5VDC from coin mech interface - to the white wire interface screw (and to the red wire interface screw if a dual cage). NOTE: If 3.5 - 5.5VDC is present see 9f on the next page. If no voltage reading is found see 9i on next page.
<i>**Continued on next page**</i>		

TROUBLESHOOTING - LIGHT BOX

PROBLEM	CAUSE	SOLUTION
Continued from previous page	7e) Coin mech wire harness is bad.	Check for 12VDC on coin mech interface + and -, then verify you have 3.5 - 5.5VDC at end of micro switch wires.
	7f) Coin mechanism micro switches are bad.	Remove wires from micro switch and touch them together, if game starts then one or both micro switches are bad.
	7g) Communication line plugged into circuit board SIO1 coin line incorrectly.	Verify the communication line from the coin box is plugged into the SIO1 Coin line on the circuit board.
	7h) "Noise" on communication line.	Check ground connections for eliminating noise and communication wires for damage.
	7i) Bad Coin Mech Interface	Replace Coin Mech Interface
	7j) Yellow or Red "LED" light wires grounded to light box.	Verify the yellow and red "LED" light wires are not touching the light box where connected to the "LED" lights.
	7k) Defective controller block	Repair or replace circuit board controller block. See page 62 for repair details.
Token inserted in coin box, all components begin operation except "yellow light".	8a) Controller block memory is scrambled.	Re-program controller using factory default settings.
	8b) No triggering voltage to yellow "LED" light from "Controller Block".	Check for 6 - 9VDC (light off) on the circuit board "LED yellow" terminal block connector. Check for .8 - 1.5VDC (light on) on the circuit board "LED yellow" terminal block connector.
	8c) Defective yellow "LED" light	Replace yellow "LED" light.
	8d) Bad light box ground	Repair ground connections.
	8e) "LED" wire harness is bad	Check wires for loose connections, nicks, and frayed wires. Repair or replace as needed.
	8f) Defective controller block	Repair or replace circuit board controller block. See page 62 for repair details.

TROUBLESHOOTING - LIGHT BOX

PROBLEM	CAUSE	SOLUTION
Token inserted, all components begin operation except red light.	9a) Controller block memory is scrambled.	Re-program controller using factory default settings.
	9b) No triggering voltage to red "LED" light from "Controller Block".	Check for 6 - 9VDC (light off) on the circuit board "LED red" terminal block connector. Check for .8 - 1.5VDC(light on) on the circuit board "LED red" terminal block connector.
	9c) Defective red "LED" light	Replace red "LED" light.
	9d) Bad light box ground	Repair ground connections.
	9e) "LED" wire harness is bad	Check wires for loose connections, nicks and frayed wires. Repair or replace as needed.
	9f) Defective controller block	Repair or replace circuit board controller block. See page 62 for repair details.
Token inserted, all components begin operation except pinch roller.	10a) Bad or loose connection on power cord, going from "Light box" to "Pinch roller motor".	Check wires for loose connection. Trace from light box to pinch roller motor. Repair or replace as needed.
	10b) Pinch roller split collar is loose on pinch roller motor shaft.	Tighten pinch roller split collar on the pinch roller wheel shaft. Align the slit of the split collar with the slit of the pinch roller wheel shaft. Tighten split collar on end of pinch roller wheel shaft closest to motor.
	10c) Defective pinch roller motor.	Disconnect pinch roller motor from light box wires and check for 120VAC at end of pinch roller cord coming from the light box. If 120VAC is present, replace pinch roller motor.
	10d) Defective pinch roller relay.	Repair or replace relay circuit board. See page 62 for repair details.
	10e) Controller block memory is scrambled.	Re-program controller using factory default settings.
	10f) Defective controller block.	Repair or replace circuit board controller block. See page 62 for repair details.
Pinch roller begins operating when light box is plugged into outlet. No lights are on.	11a) Defective pinch roller relay	Repair or replace relay circuit board. See page 62 for repair details.
	11b) Defective controller block	Repair or replace circuit board controller block. See page 62for repair details.

TROUBLESHOOTING - PITCHING MACHINE

PROBLEM	CAUSE	SOLUTION
Inaccurate count on pitched balls.	1a) Arm on micro switch is not bent enough to count balls accurately.	If pitching machine is pitching more balls than programmed for, bend arm on micro switch up slightly. If pitching machine is pitching fewer balls than programmed for, bend arm on micro switch down slightly.
	1b) Wires to micro switch have been knocked off or are loose.	Check wire connection at micro switch, tighten or reconnect as needed. Crimp new fork terminal on wire if it has pulled out of fork terminal.
	1c) Defective "Ball Count micro switch".	To verify remove wires from micro switch, touch them together and release. Every time you touch and release one ball should count down. Have someone observe display panel when conducting this test. If you obtain a count down on display panel with this test, replace micro switch.
	1d) Defective controller block	Check for 3.5 - 5.5VDC on the circuit board "ball" terminal block connector. Repair or replace circuit board controller block if not present with wire removed.
Inaccurate pitches	2a) Incorrect wheel to wheel spacing or wheel to pad spacing.	Verify proper spacing, adjust if necessary. Refer to "Servicing Your Equipment" in service manual.
	2b) Wheels on machine are worn.	Inspect wheels for excessive wear, uneven wear, or chunks of material that are missing. Replace wheel "immediately".
	2c) Wheels are not parallel to each other or not parallel to frame.	Make sure ball contact surfaces on wheels are parallel to each other. Adjust wheel shaft to correct alignment. Verify parallel to frame.
	2d) Balls are worn out.	Inspect balls for wear and replace as needed.
	2e) Varying sizes of balls in system.	If new balls are added to old balls, inaccurate pitches may result. Maintain a consistent size of balls.
	2f) Dirt build-up on wheels.	Inspect wheels for steady build-up. Wheels may be cleaned with a rag and acetone, with machine turned off. For heavy build-up, use a 60 grit emery cloth or sand paper.
	2g) Plastic feed chute (tongue) is out of alignment.	Refer to "Servicing Your Equipment" in service manual for adjustment procedure. page 24

TROUBLESHOOTING - PITCHING MACHINE

PROBLEM	CAUSE	SOLUTION
Pitching machine is noisy.	3a) Drive belt on machine is worn or frayed.	Replace "AA-55" drive belt.
	3b) Bearing on idler pulley is bad.	Replace idler pulley.
	3c) Wheel shaft bearing is worn.	Replace wheel shaft bearing.
	3d) Incorrect wheel spacing on machine.	If wheels are too close, a loud "bang" will occur when a ball is pitched. Make shaft spacing adjustment. Refer to "Servicing Your Equipment" in service manual for adjustment procedure. page 22
Pitching machine is vibrating.	4a) Wheels on machine are out of balance (harmonic imbalance).	Adjust speed of machine slightly in one direction or the other. Many times a difference in Rpm's will make a vibration go away. Or interchange top and bottom wheels.
	4b) Drive belt on machine is worn or frayed.	Replace "AA-55" drive belt.
	4c) Wheel wobble.	This occurs when wheels are not mounted properly and causes the wheels to wobble side to side. Remove wheel, flip shaft collar around and make sure all mating surfaces are clean, then remount the wheel. If wobble still exists, interchange or replace wheel.
	4d) Idler pulley or wheel shaft bearings are bad.	Replace idler pulley or wheel shaft bearings as needed.
Machine requires frequent adjustment for balls that are pitching high/low.	5a) Locking nut on hi/low crank handle is tightened in wrong location.	Refer to "Servicing Your Equipment" in service manual for adjustment procedure. page 21

TROUBLESHOOTING - AUTOMATIC CONVEYOR SYSTEM

PROBLEM	CAUSE	SOLUTION
Conveyor belt is not moving.	1a) No power at the outlet.	Make sure power cord is plugged in all the way. Check for power at the outlet with a multi-meter or by plugging in a drill, radio or other device. If no power is detected check circuit breaker.
	1b) Conveyor motor drive belt has derailed.	Lift up on motor and install drive belt. Check pulley alignment.
	1c) Ball stuck in conveyor.	Dislodge any balls that are stuck in the conveyor, look down inside the bottom end of the conveyor for balls jammed around conveyor belt pulley.
	1d) Damaged power cord.	Check for nicks or cuts in power cord. Repair or replace as needed.
	1e) Damage to male end of power cord.	Remove male end of plug and check for damaged or loose wires.
	1f) Defective conveyor motor.	To verify, check for 115VAC at motor. If voltage is present, replace motor.
	1g) Loose elevator flight bolts catching on top end of conveyor	Tighten loose elevator flight bolts. NOTE: Do not over tighten bolts.
	1h) Current Sensor sensitivity adjustment.	Refer to "Servicing Your Equipment" in service manual for adjustment procedure. page 82
	1i) Bad "current sensor".	Replace "current sensor" or call ABC for verification.
Baseball and/or softball distributing motors are not turning.	2a) Stuck ball in hopper area.	Dislodge any jammed balls.
	2b) Circuit breakers on baseball/softball hoppers have popped.	Check for any jammed balls, dislodge them, and reset circuit breakers on hoppers. If breaker keeps popping, breaker will need replaced.
	2c) Power cord knocked loose by balls.	Check power cord at outlet.
	2d) Damaged power cord.	Check for nicks or cuts on power cord. Repair or replace as needed.
	2e) No power at outlet.	Check circuit breaker in service panel, if okay call ABC for instructions.
	2f) Bad current sensor.	Adjust current sensor sensitivity. See page 82 for details. NOTE: If conveyor outlet will still not turn on after adjustment, the current sensor will need replaced.

TROUBLESHOOTING - AUTOMATIC CONVEYOR SYSTEM & HOPPER AGITATING SYSTEM

PROBLEM	CAUSE	SOLUTION
Ball troughs are not filling with balls.	3a) Balls not returning to sump area.	Dislodge balls from back of stalls in pit area and all other areas in batting cage.
	3b) Ball quantity is low.	Add balls to system (add a dozen at a time and watch for results).
	3c) Balls are hung up in various areas.	Check for balls hung up in various areas (i.e. holes in netting, hung up by pitching machine power cords, etc....)
HOPPER AGITATING SYSTEM.	3d) Foreign object stuck in trough.	Dislodge foreign objects.
Ball agitator motor is not turning.	1a) Tripped circuit breaker.	Reset 10 amp breaker which is located next to the agitator motor.
	1b) Ball jammed in ball agitator.	Clear jammed ball and reset breaker if needed.
	1c) Loose electrical connections.	Disconnect A/C power and check all connections at the motor and the junction box.
	1d) Defective hopper motor.	To verify, check for 120VAC at the motor. If voltage is present, replace the hopper motor.
	1e) No 120VAC power at the receptacle.	Check main service panel circuit breaker and reset.
Agitator twisted or damaged.	2a) Jammed ball in agitator area.	Replace or repair agitator.
	2b) Defective 10amp breaker.	Replace 10amp circuit breaker.

TROUBLESHOOTING - LIGHT BOX WARNING LIGHTS AND CIRCUIT BOARD CONTROLLER BLOCK ERROR CODE GUIDE

LIGHT BOX WARNING LIGHT NORMAL CONDITION.

RED	YELLOW	CONDITION
Off	Off	Off mode.
Off	Flash	Waiting for run button.
		Paused.
Off	Solid	Starting.
Solid	Solid	Running.
Simultaneous Flash	Flash	Elevation program mode.
		Coins / balls program mode.

In an error condition, the light box will flash the "Red" and "Yellow" warning lights in an alternating sequence. Additionally, the red LED light will flash on the circuit board controller block. The number of flashes will report the error condition. After the flashes, there will be a 3 to 5 second pause, then the controller block will reset. When resetting from an error code, the controller block LED will turn on solid for 2 seconds. After the reset, if the error condition is still in effect, the LED will flash again and the processor reset.

This process will loop until the error condition is corrected.

LIGHT BOX WARNING LIGHT ERROR CONDITION.

RED	YELLOW	CONDITION
Alternating Flash	Flash	See circuit board controller block "Red LED" light condition below.

CIRCUIT BOARD CONTROLLER BLOCK "RED LED" LIGHT ERROR CODE TROUBLESHOOTING GUIDE

NOTE: At initial power-up, the LED light on the controller block will turn on solid for 5 seconds.

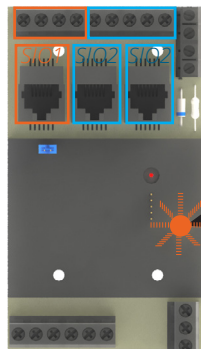
FLASH COUNT	ERROR CONDITION
4	SIO2 communication line is either shorted or held high.
6	SIO1 coin communication line is either shorted or held high.
8	An Under-Voltage condition is detected. Possible Causes Include: 1. Over-current on SIO2 communication line that's tripped the fuse inside the power supply or controller block. 2. Power Supply failure.

NOTE: If an error condition is detected, the pitching machine and feeder relays will be turned off, and any running game will be deleted and lost.

CIRCUIT BOARD CONTROLLER BLOCK PORT DIAGRAM

SIO1: The coin communication line from the light box to the coin box. Also used for the speed interface and elevation actuators for the Select-A-Pitch system.

SIO2: The communication line that is either daisy chained between light boxes, to a splice board or to the display panel usually located in a ticket booth/office.



ERROR FLASH

KB ELECTRONICS RETURN AUTHORIZATION FORM

(PLEASE FILL OUT INFORMATION BELOW AS COMPLETELY AS POSSIBLE.)

RMA# _____ DATE: _____ CUSTOMER# _____
(RMA number will be issued upon completion of this form)

REMOVE THE "BLACK POWER CORD", "SPEED INTERFACE" (SELECT-A-PITCH ONLY) AND "MOUNTING BRACKET" FROM THE AC CONTROLLER BEFORE SENDING IN FOR REPAIRS. KB ELECTRONICS IS NOT RESPONSIBLE FOR LOST OR DAMAGED ITEMS DURING SHIPPING AND/OR REPAIR.

KB Electronics will inspect your drive and inform J&J if the drive is repairable, and if repairable what the cost will be. J&J will then contact you with this information; you will then need to let J&J know if you want the repairs completed.

Please verify the following information is correct, write the RMA number on the outside of the return box and include this document when returning your AC Controller for repairs.

Please ship AC Controller(s) to address below: (Not J&J Amusements)

KB Electronics
Attn: Ann Lai
12095 NW 39Th Street
Coral Springs, FL 33065-2516

COMPANY NAME: _____ CONTACT NAME: _____

SHIP TO ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____ COUNTRY: _____

CONTACT NUMBER: _____ SERIAL NUMBER(S): _____

EMAIL: _____

DESCRIPTION OF THE PROBLEM: _____

NOTE: All repaired items will be shipped back to you via UPS-GROUND unless otherwise specified.

Please check one of the optional shipping methods if faster delivery is preferred.

Overnight ☐ 2-Day ☐ 3-Day ☐

NOTE TO KB ELECTRONICS: Please contact J&J with a repair quote before any repairs are performed. J&J will contact the customer for approval of the repairs. J&J will contact KB Electronics and confirm the repairs have been authorized or declined.

PHENIX CONTROLS RETURN AUTHORIZATION FORM

(PLEASE FILL OUT INFORMATION BELOW AS COMPLETELY AS POSSIBLE.)

RMA# _____ DATE: _____ CUSTOMER# _____
(RMA number will be issued upon completion of this form)

To have your electronics evaluated or repaired, please send them directly to Phenix Controls (Not J&J Amusements) at the address below. Phenix Controls will evaluate the item and quote a price for repair prior to any work being done. Once the item is inspected, J&J will email or call with the repair cost using the contact information provided on the form.

Attn: Tim Green
Phenix Controls
1619 South Minnie St.
Santa Ana, CA 92707
(714) 547-4316

Please verify the following information is correct, write the RMA number on the outside of the return box and include this document when returning your items for repairs.

COMPANY NAME: _____ CONTACT NAME: _____

SHIP TO ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____ COUNTRY: _____

CONTACT NUMBER: _____ EMAIL: _____

DESCRIPTION OF THE PROBLEM: _____

NOTE: All repaired items will be shipped back to you via UPS-GROUND unless otherwise specified.

Please check one of the optional shipping methods if faster delivery is preferred.

Overnight ☐ 2-Day ☐ 3-Day ☐

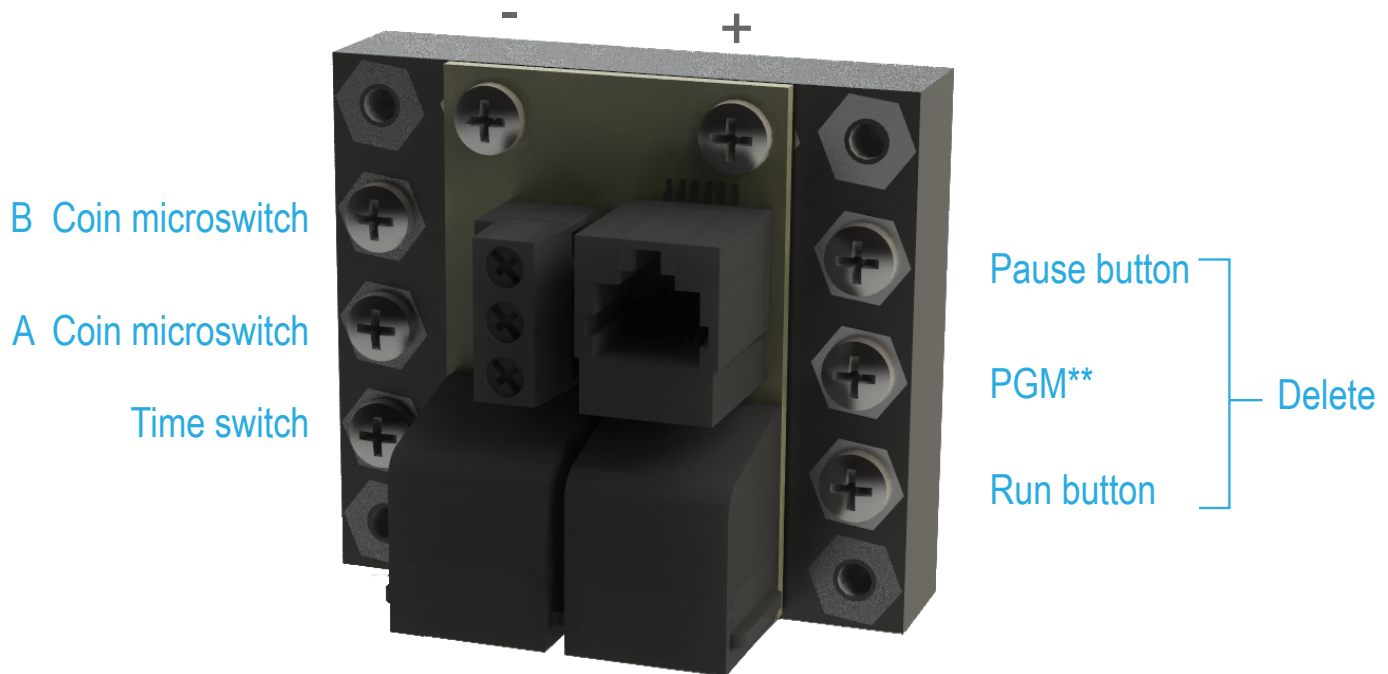
NOTE TO PHENIX CONTROLS: Please contact J&J with a repair quote before any repairs are performed. J&J will contact the customer for approval of the repairs. J&J will contact Phenix Controls and confirm the repairs have been authorized or declined.

WIRING SCHEMATICS

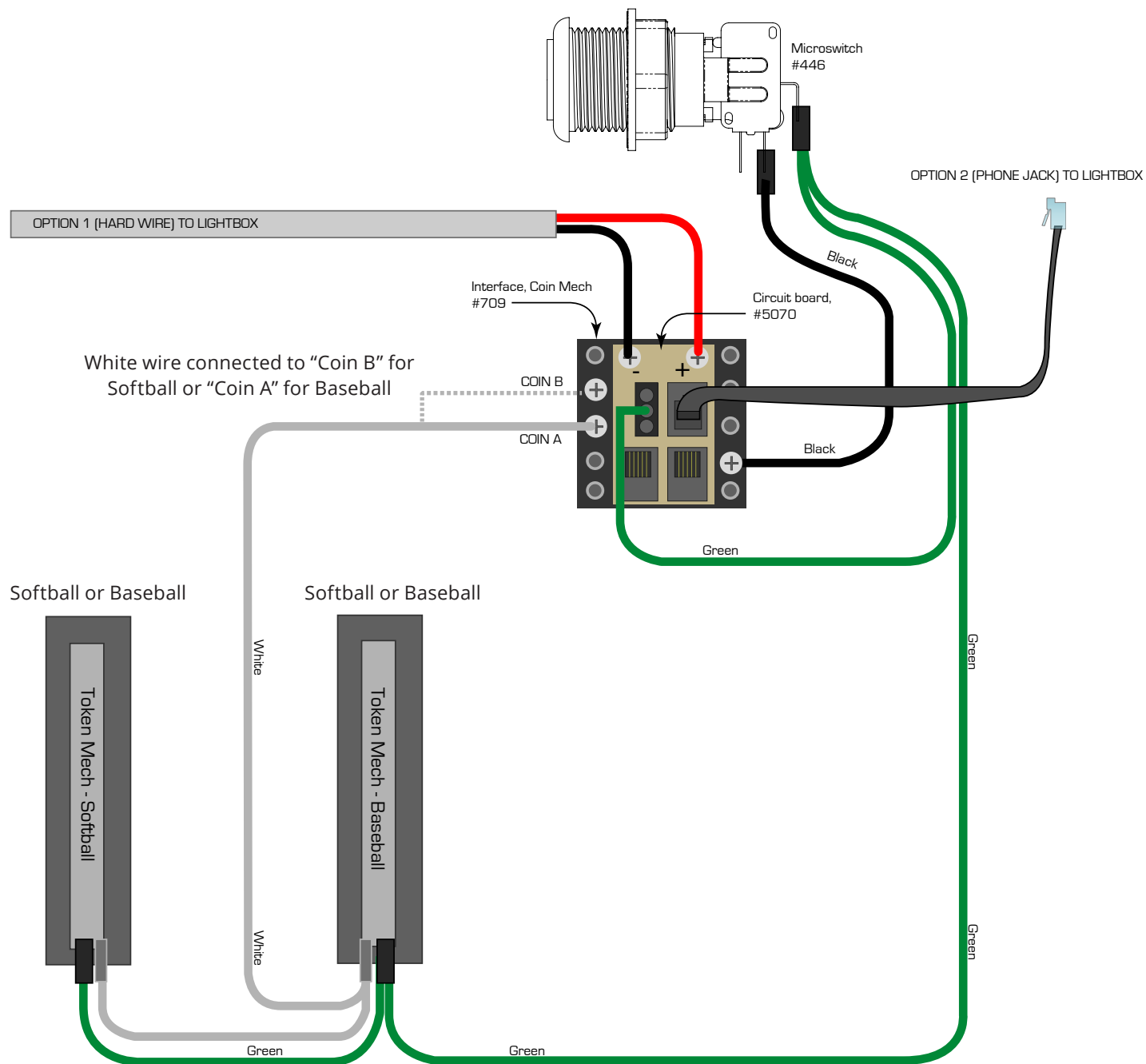
CONTENTS IN THIS SECTION

Coin Mech Interface - Triple phone jack	page 64
Coin Box Wiring - Single cage	page 65
Coin Box Wiring - Dual cage	page 68
Coin Box Wiring - Single cage with Select-A-Pitch	page 69
Coin Box Wiring - Dual cage with Select-A-Pitch	page 70
Coin Box Wiring - Card Reader (Single)	page 71
Coin Box Wiring - Card Reader (Dual).....	page 72
PT-8 Circuit Board Voltages	page 73
PT-8 Circuit Board Overview - Hard wire	page 76
PT-8 Circuit Board - Phone Jack.....	page 77
3-Phase Motor Wiring.....	page 78
Variable Speed Motor Controller - Select-A-Pitch	page 79
Variable Speed Motor Controller - Pastime	page 80
Hopper - Circuit Breaker Wiring.....	page 81
Current Sensor Adjustment Procedure.....	page 82
Current Sensor Wiring	page 83

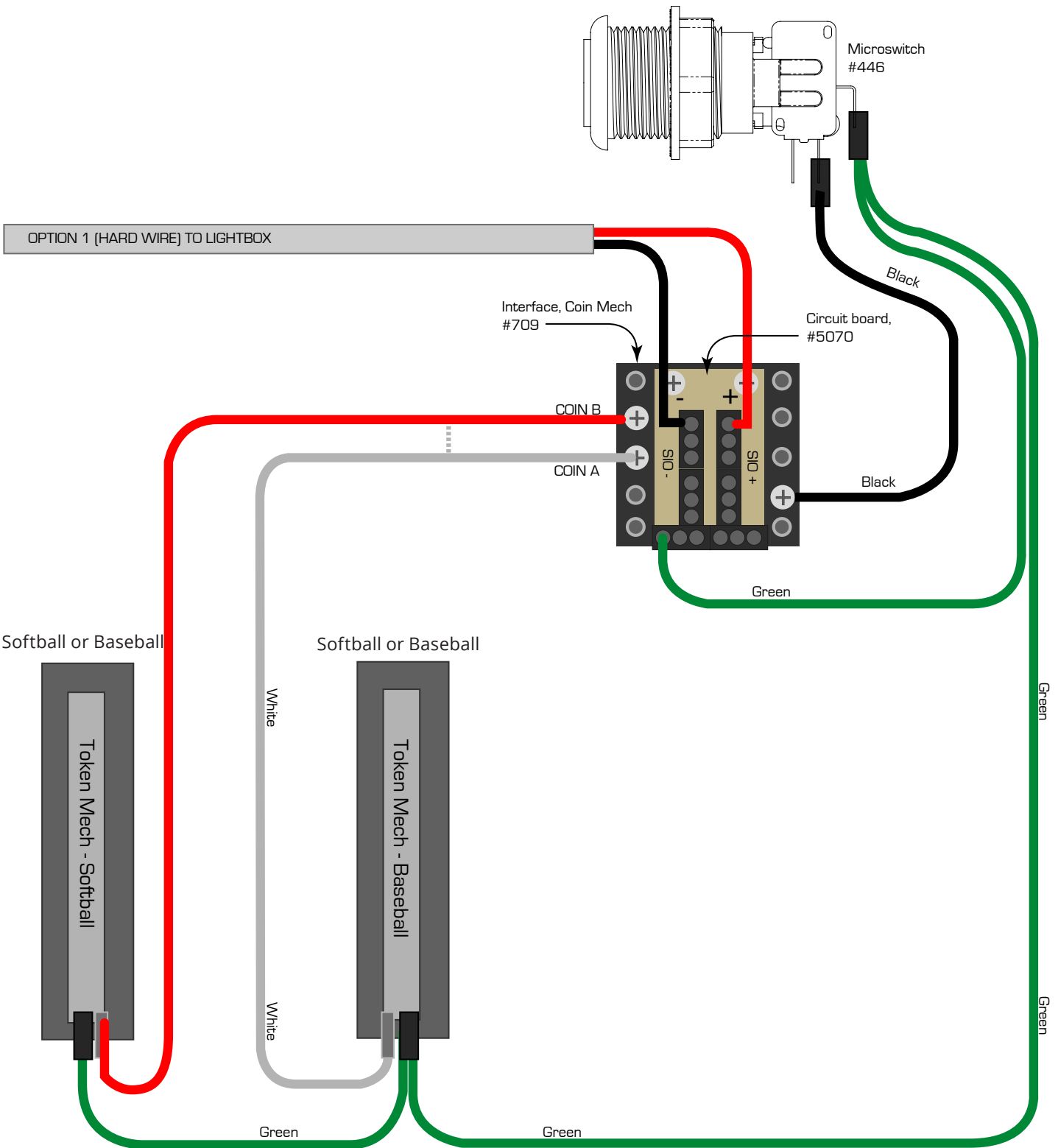
COIN MECH INTERFACE - TRIPLE PHONE JACK



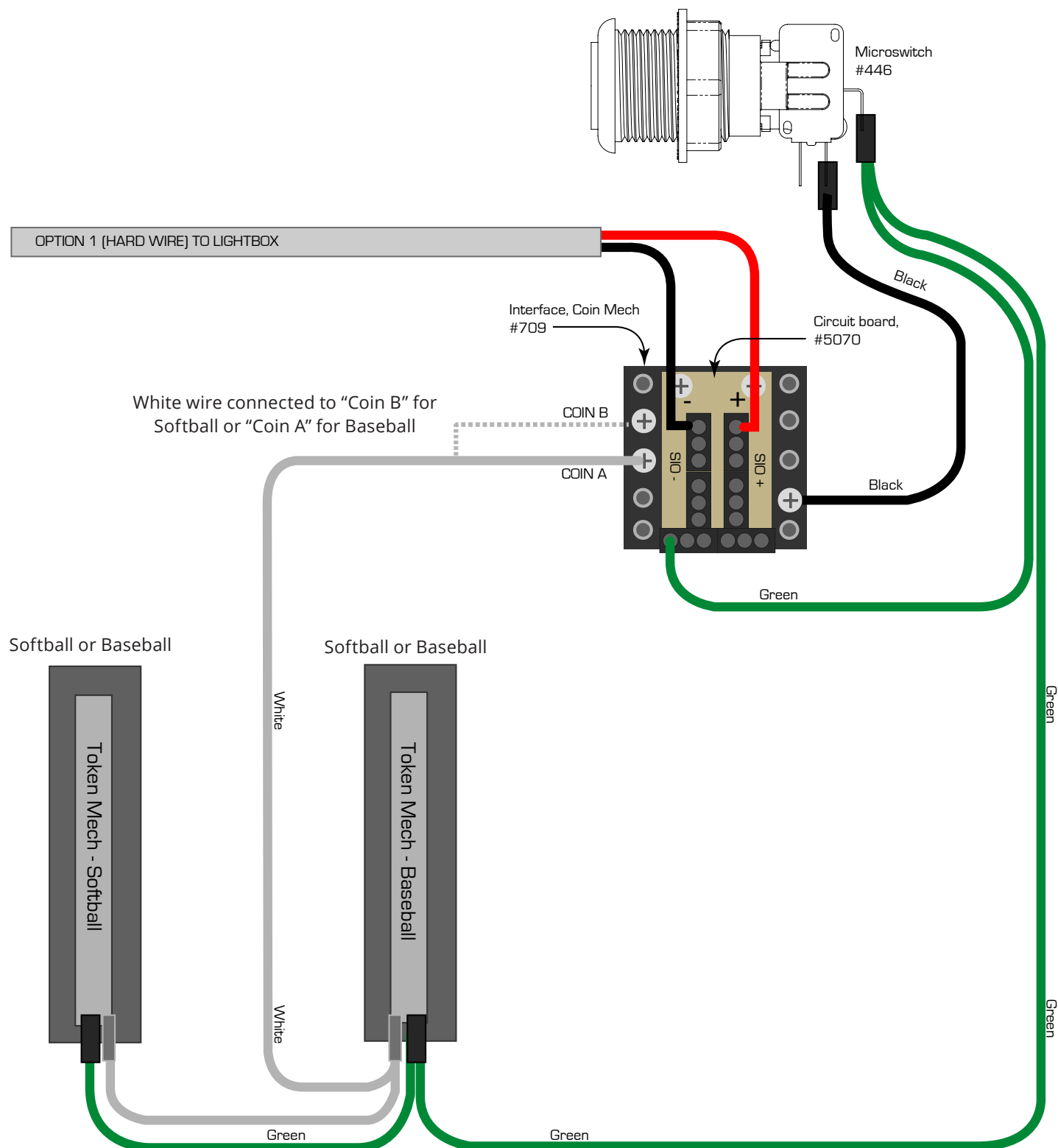
COIN BOX WIRING - SINGLE CAGE



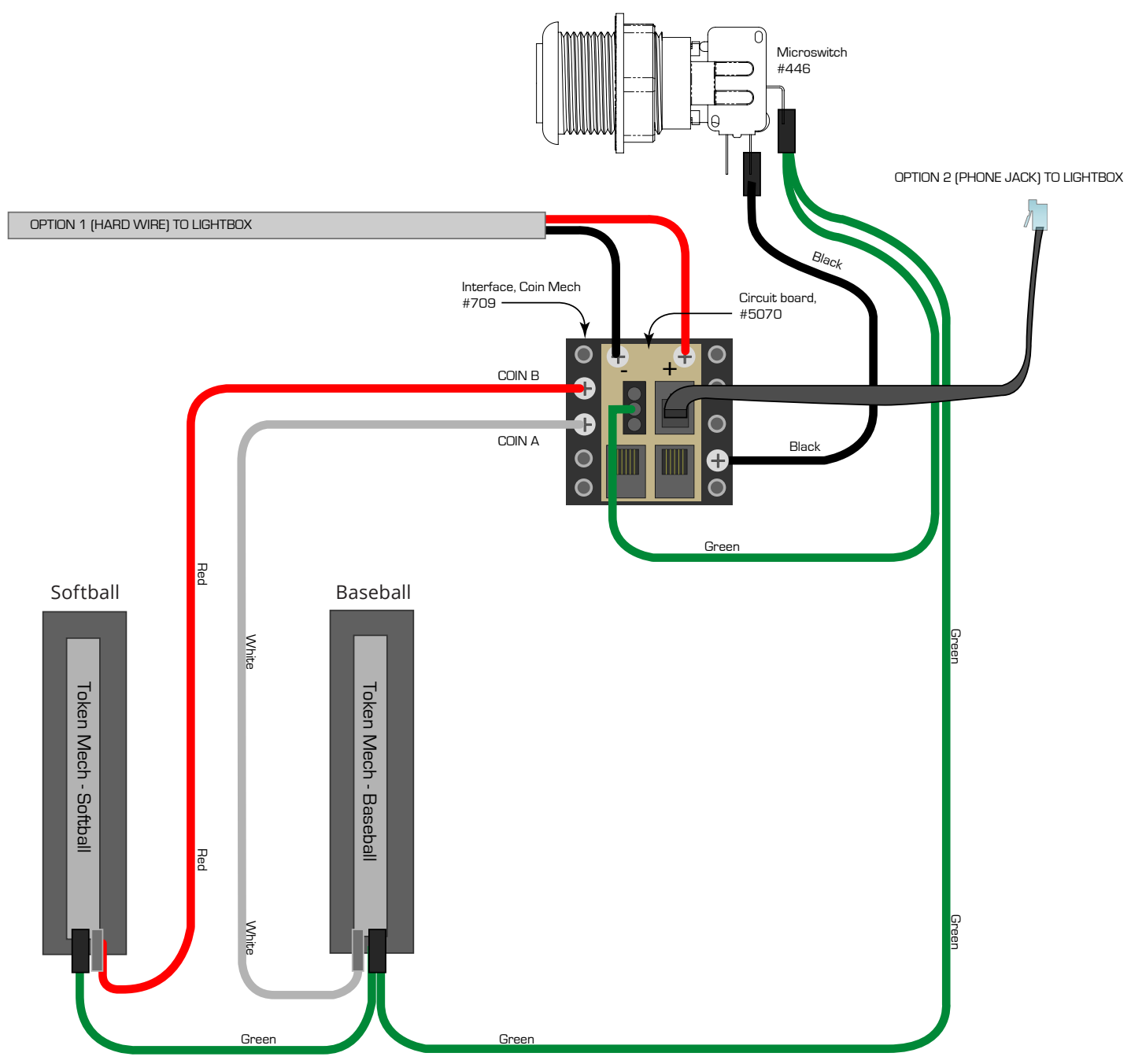
COIN BOX WIRING - DUAL CAGE WITH 6008



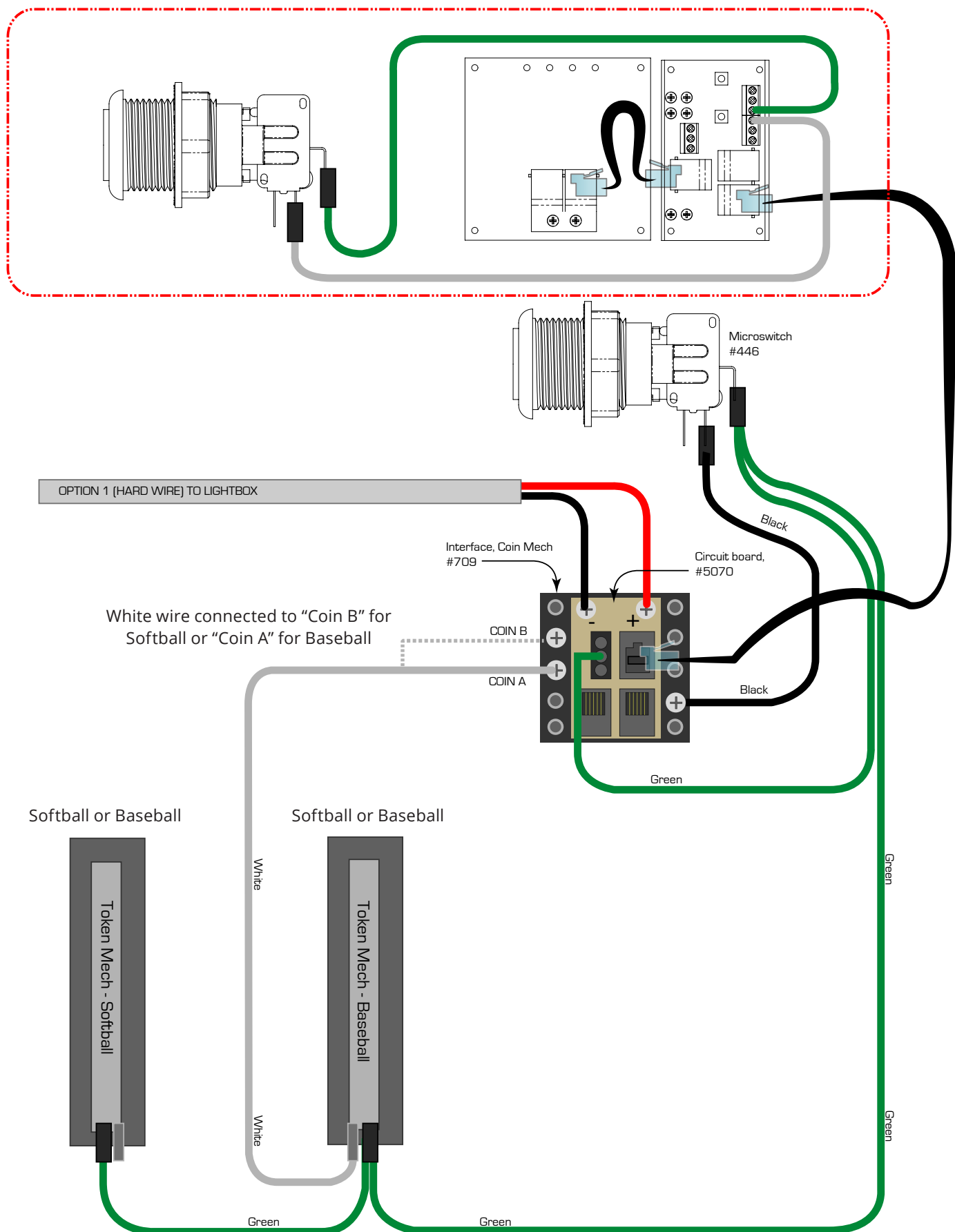
COIN BOX WIRING - SINGLE CAGE WITH 6008



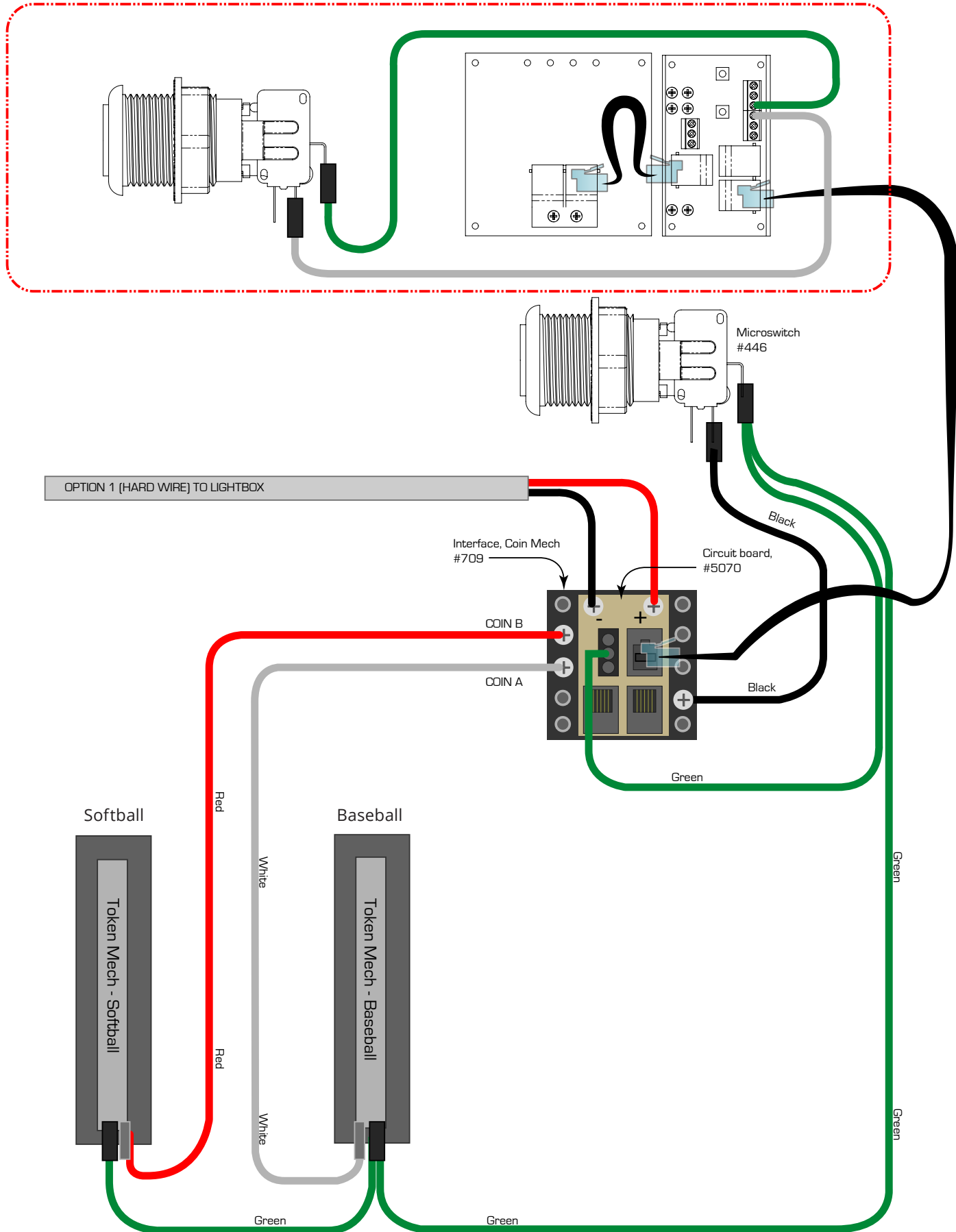
COIN BOX WIRING - DUAL CAGE



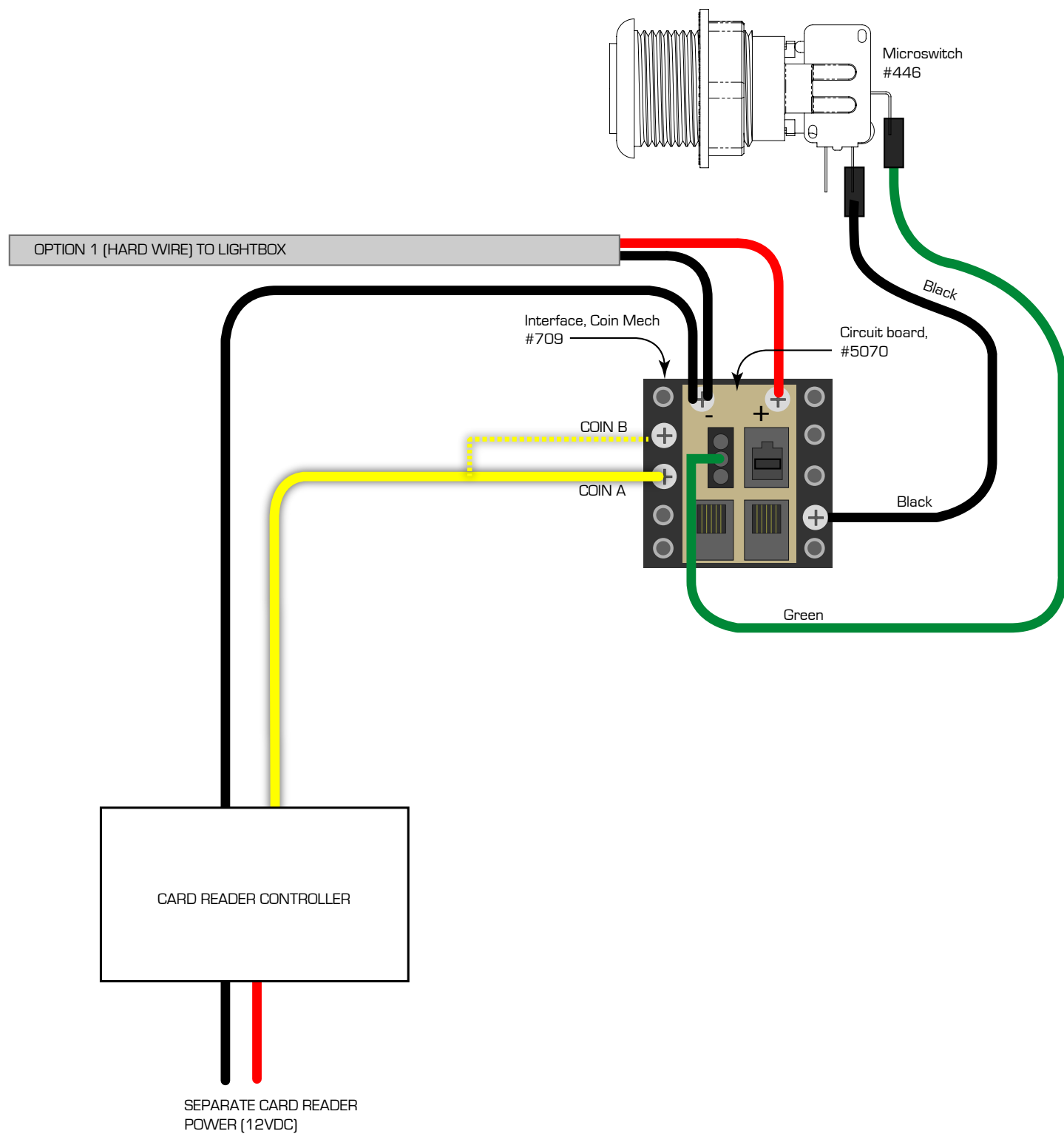
COIN BOX WIRING - SINGLE CAGE WITH SELECT-A-PITCH



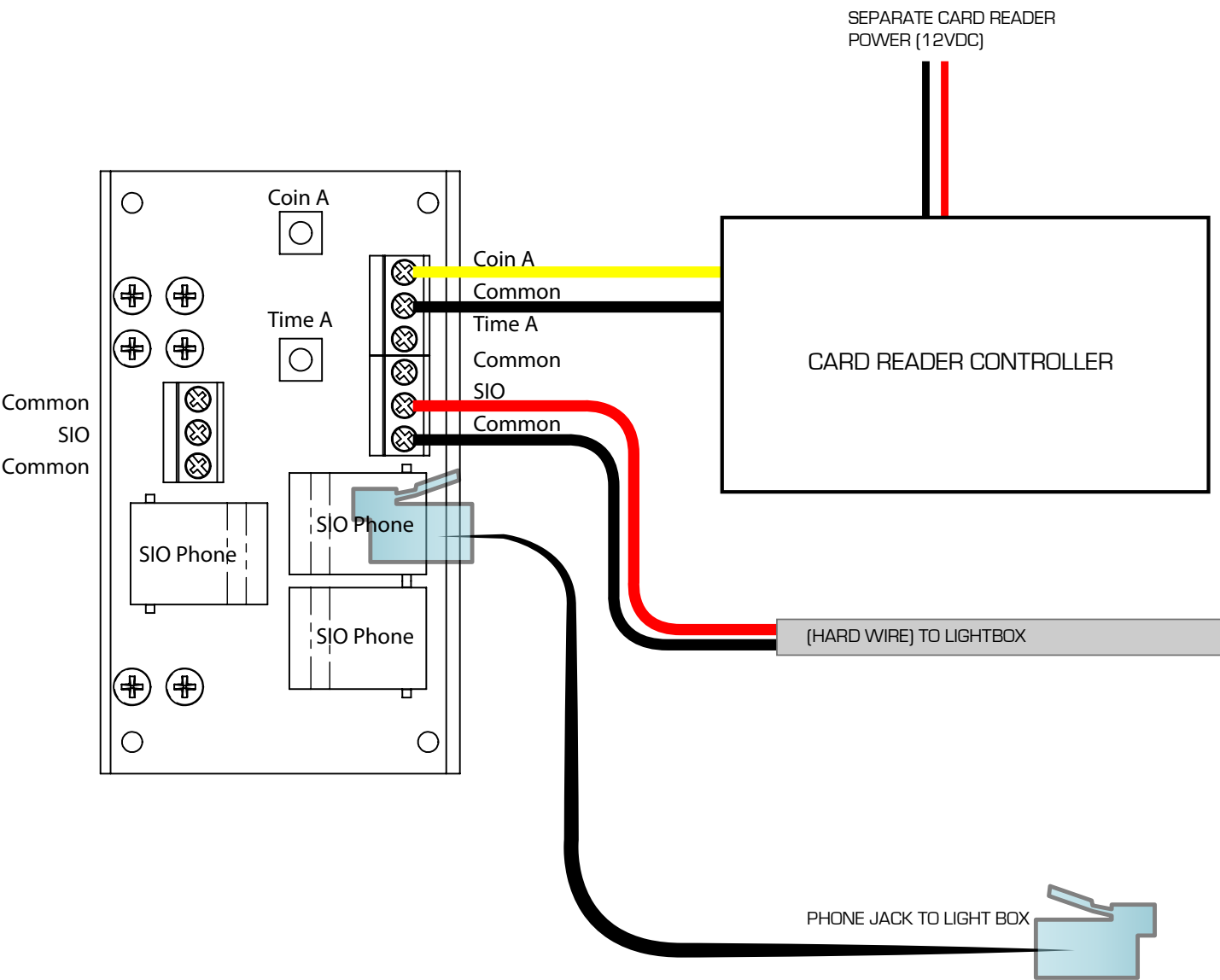
COIN BOX WIRING - DUAL CAGE WITH SELECT-A-PITCH



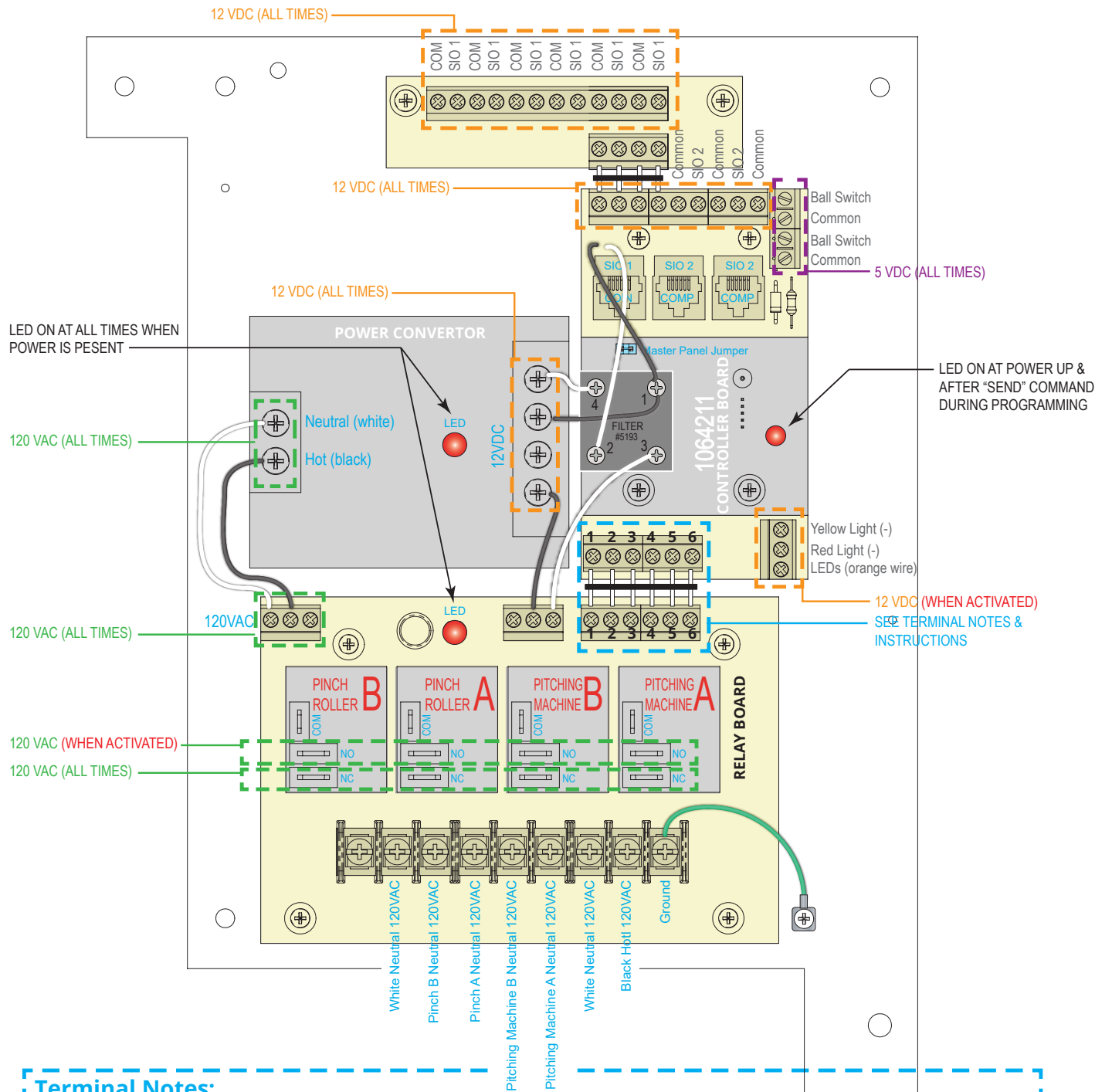
COIN BOX WIRING - CARD READER (SINGLE)



COIN BOX WIRING - CARD READER (DUAL)



PT-8 CIRCUIT BOARD VOLTAGES



Terminal Notes:

Use multimeter set to volts DC. Put black (negative) probe on any common and measure voltages on terminals with red (positive) probe.

Terminal 1	about 16 to 18 volts DC from Power supply block.
Terminal 2	Common
Terminal 3	Feed B relay
Terminal 4	Feed A relay
Terminal 5	Pitch B relay
Terminal 6	Pitch A relay

Relay terminals, terminals 3 through 6 are about 16 to 18 volts DC when relay is off.

Terminals 3 through 6 are about 1 volt DC when relay is on.

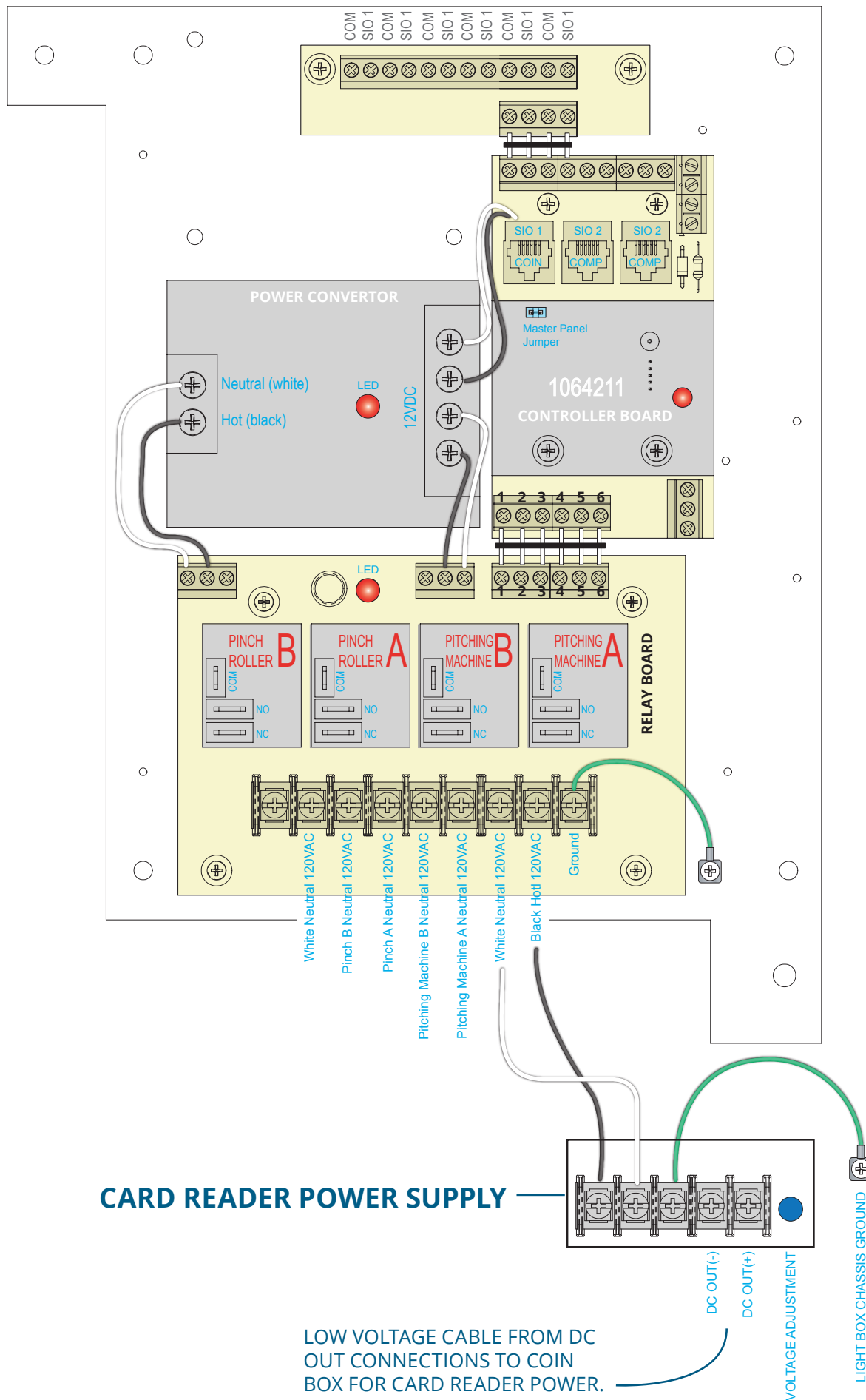
Instructions:

The controller block pulls the terminals low (about 1 vdc) when relays are turned on. Make sure the controller is pulling the terminal low when the relay should be on.

If the terminals on the controller board are being pulled low, but the terminals on the relay board is not, the connection between the terminals is not good. Check the pin for good contact between the controller and relay boards.

If the terminals are being pulled low on both controller and relay boards, but the relay still does not turn on, the relay may be bad.

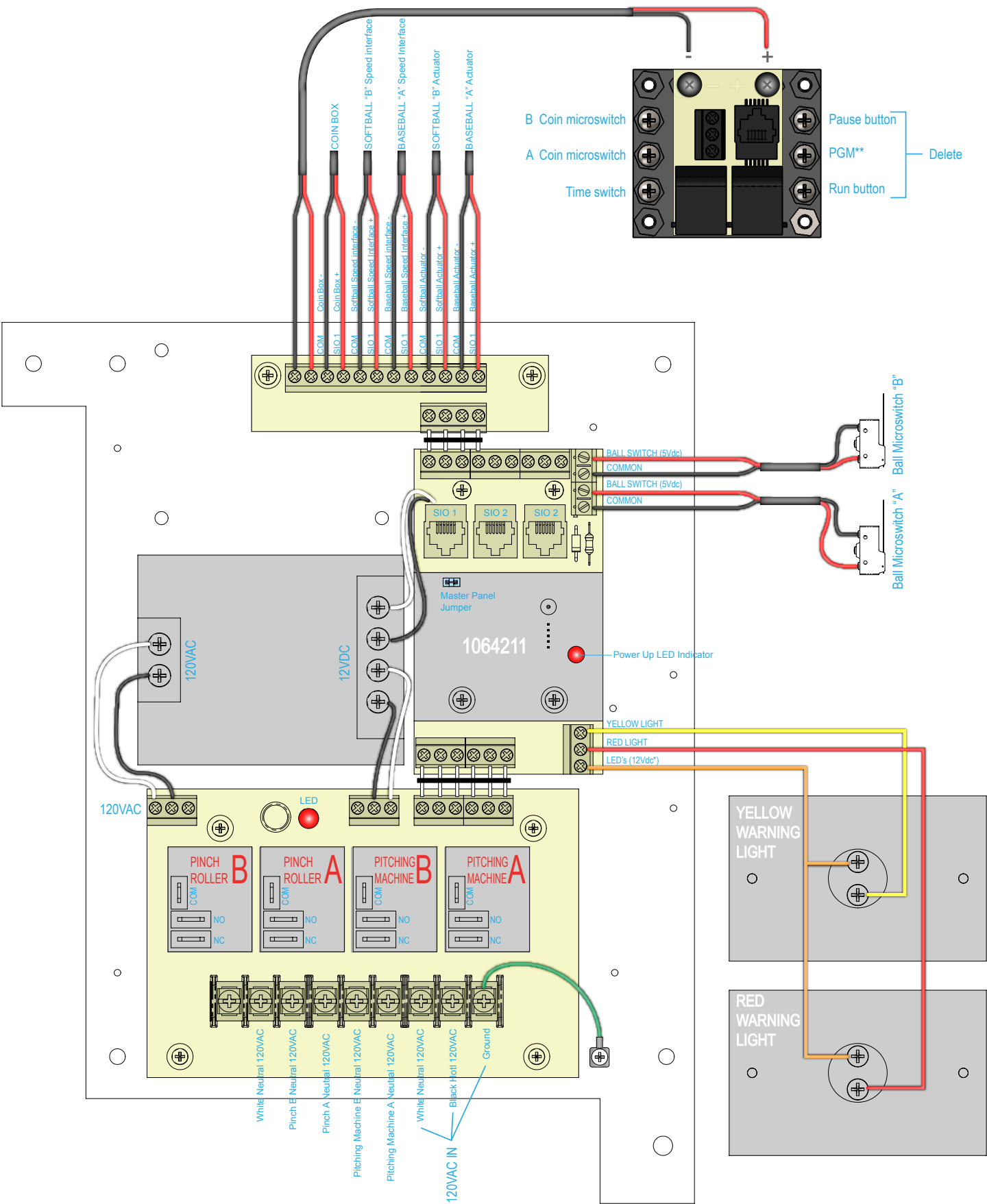
LIGHT BOX WIRING - CARD READER POWER SUPPLY



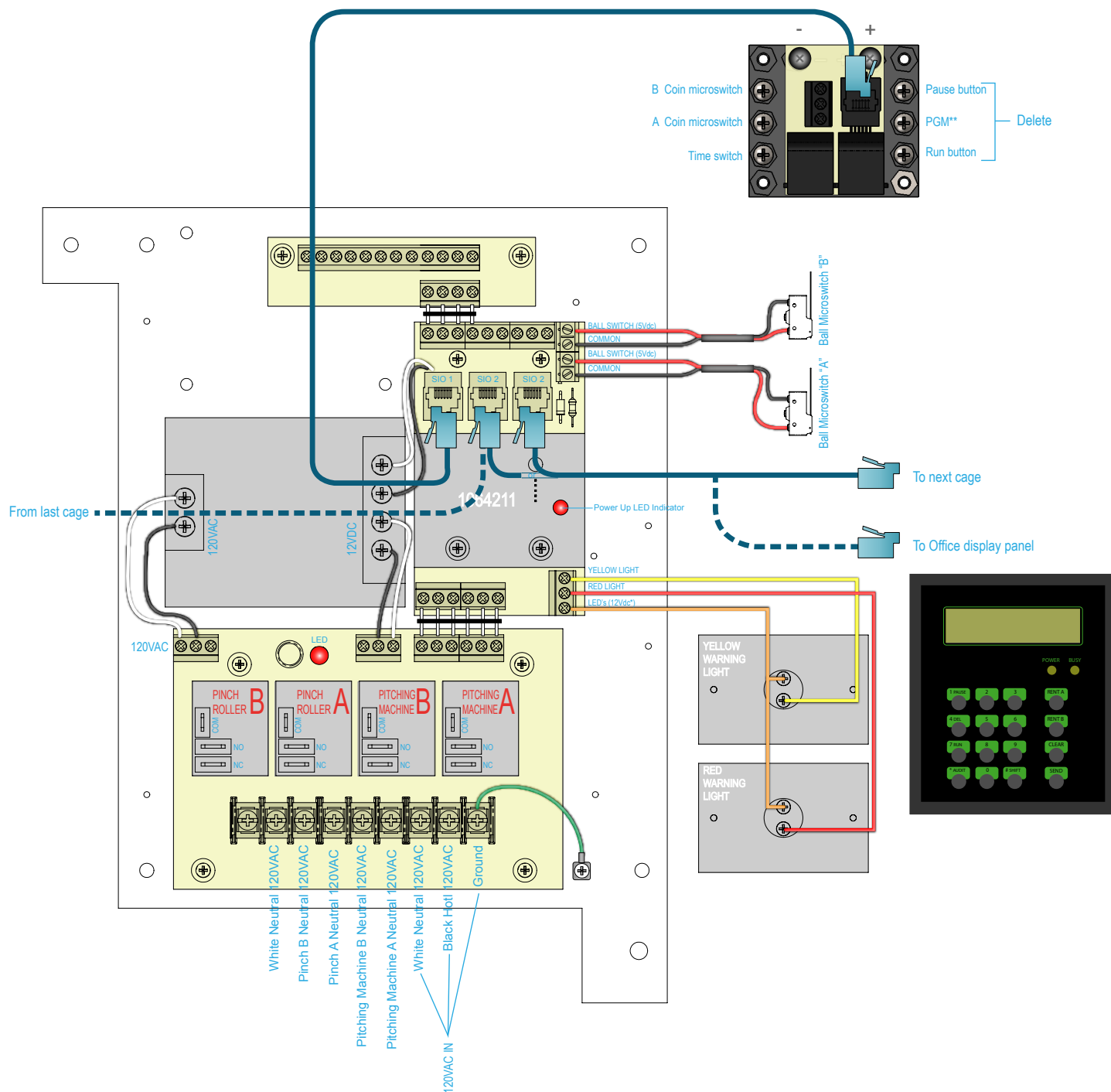


THIS PAGE INTENTIONALLY LEFT BLANK

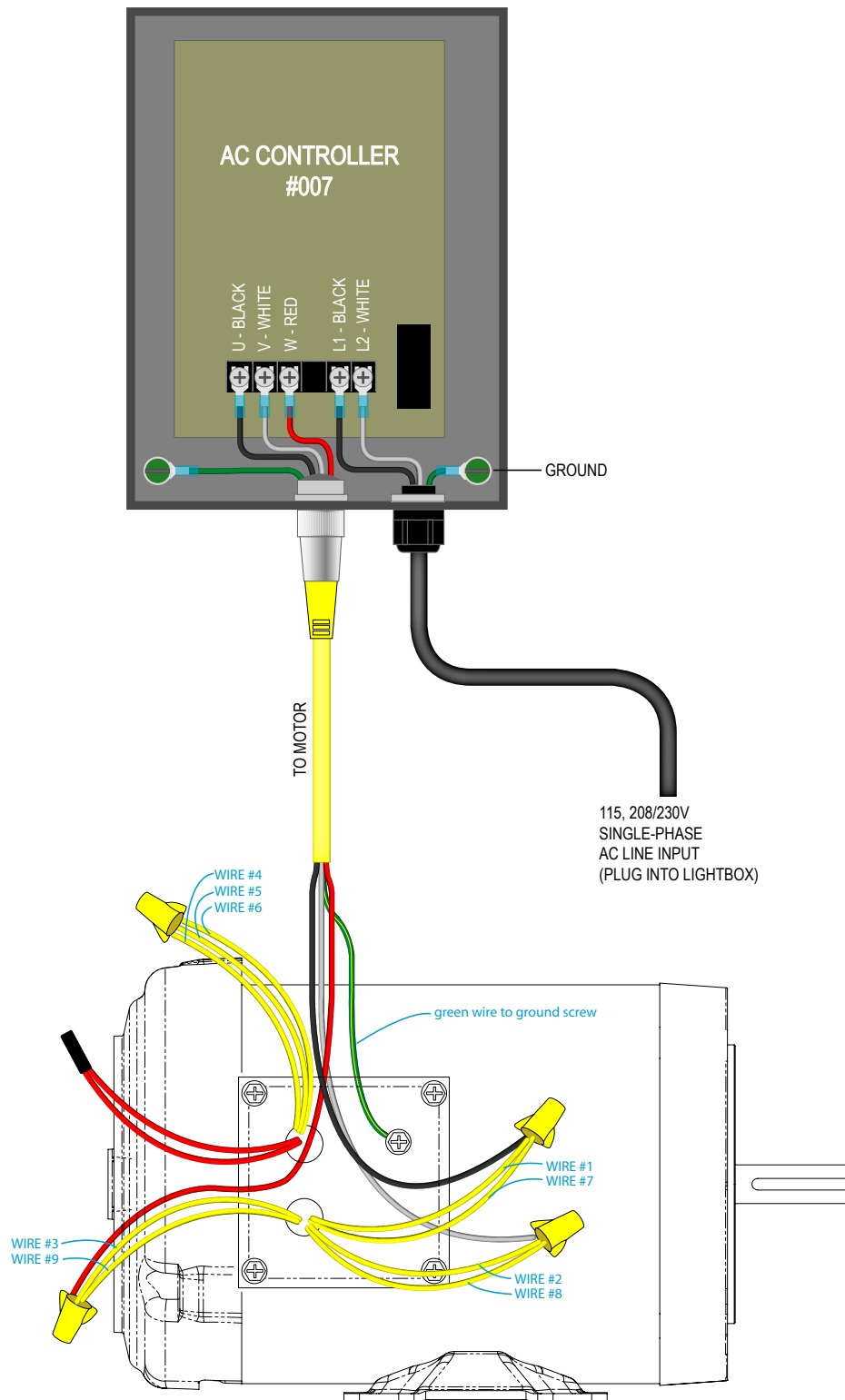
PT-8 CIRCUIT BOARD OVERVIEW - HARD WIRE



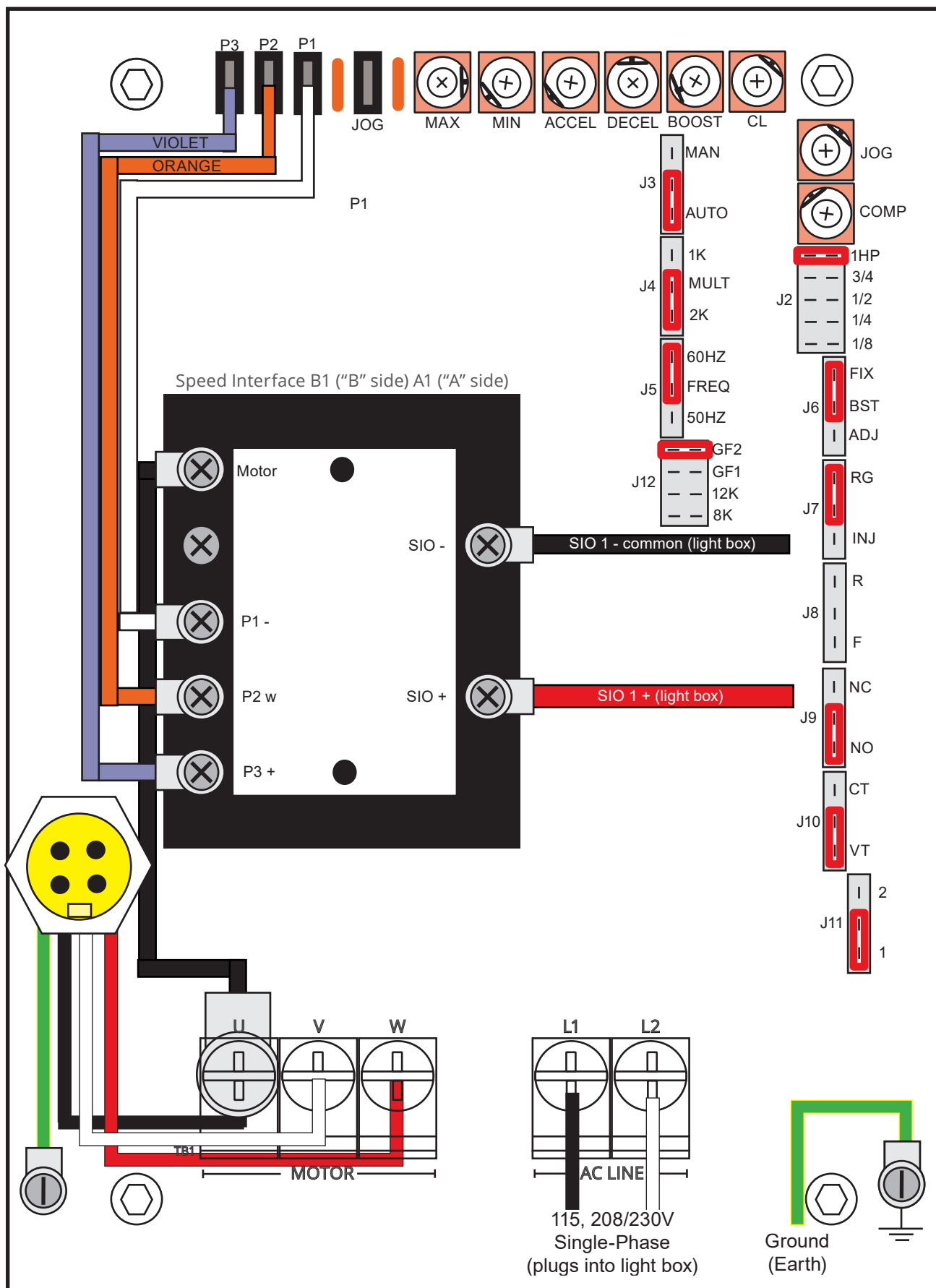
PT-8 CIRCUIT BOARD OVERVIEW - PHONE JACK



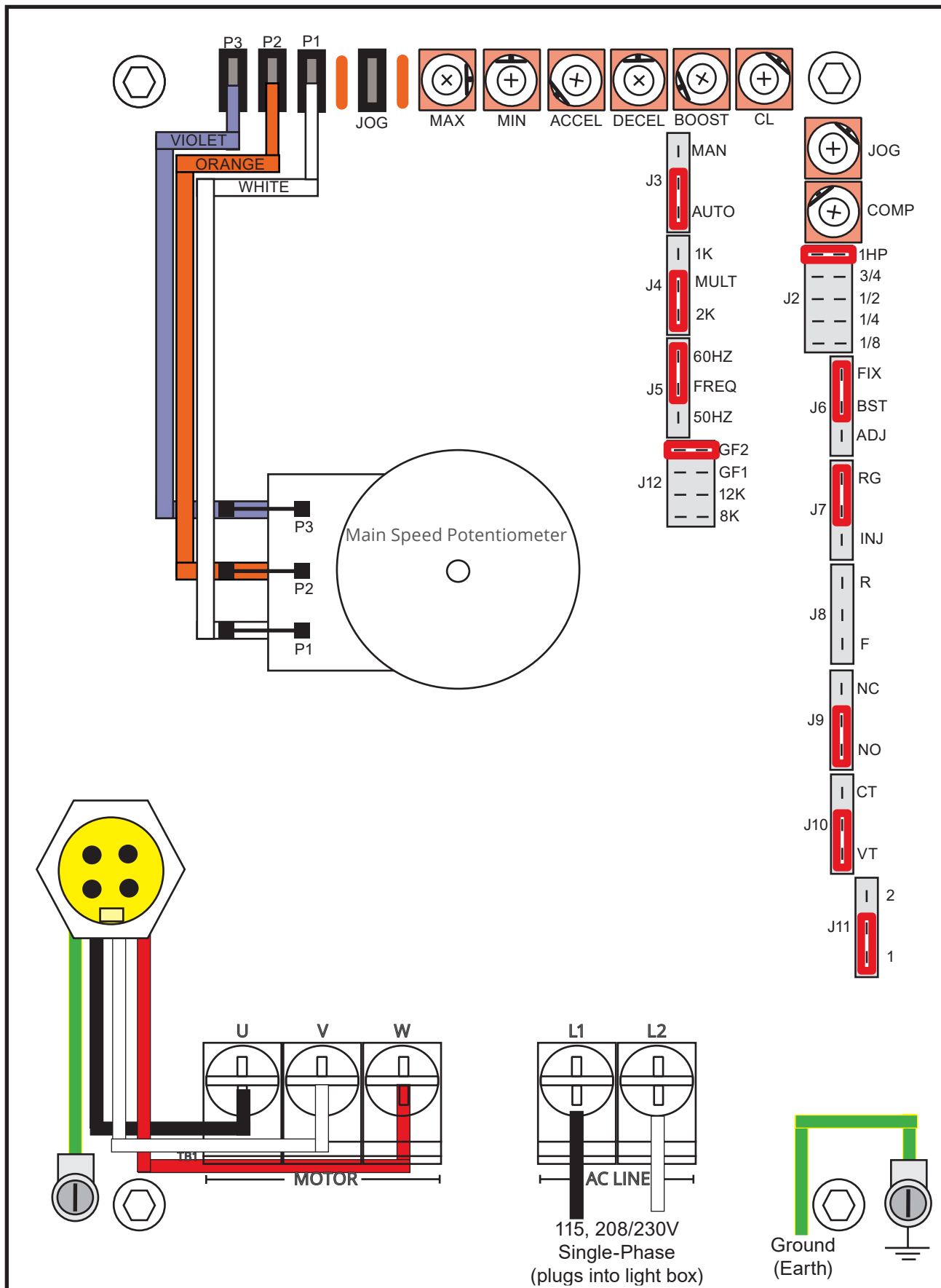
3-PHASE MOTOR WIRING



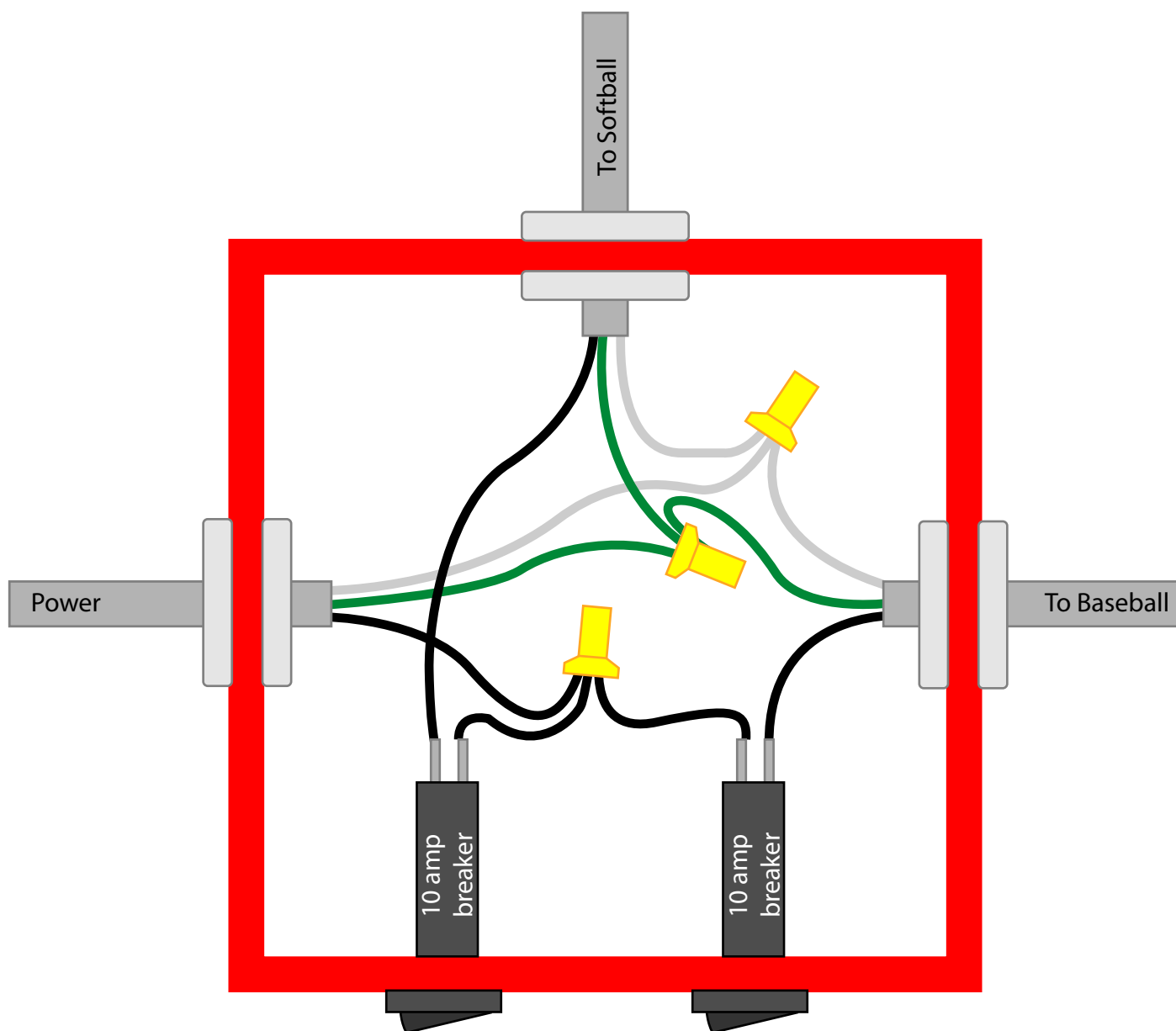
VARIABLE SPEED MOTOR CONTROLLER - SELECT-A-PITCH



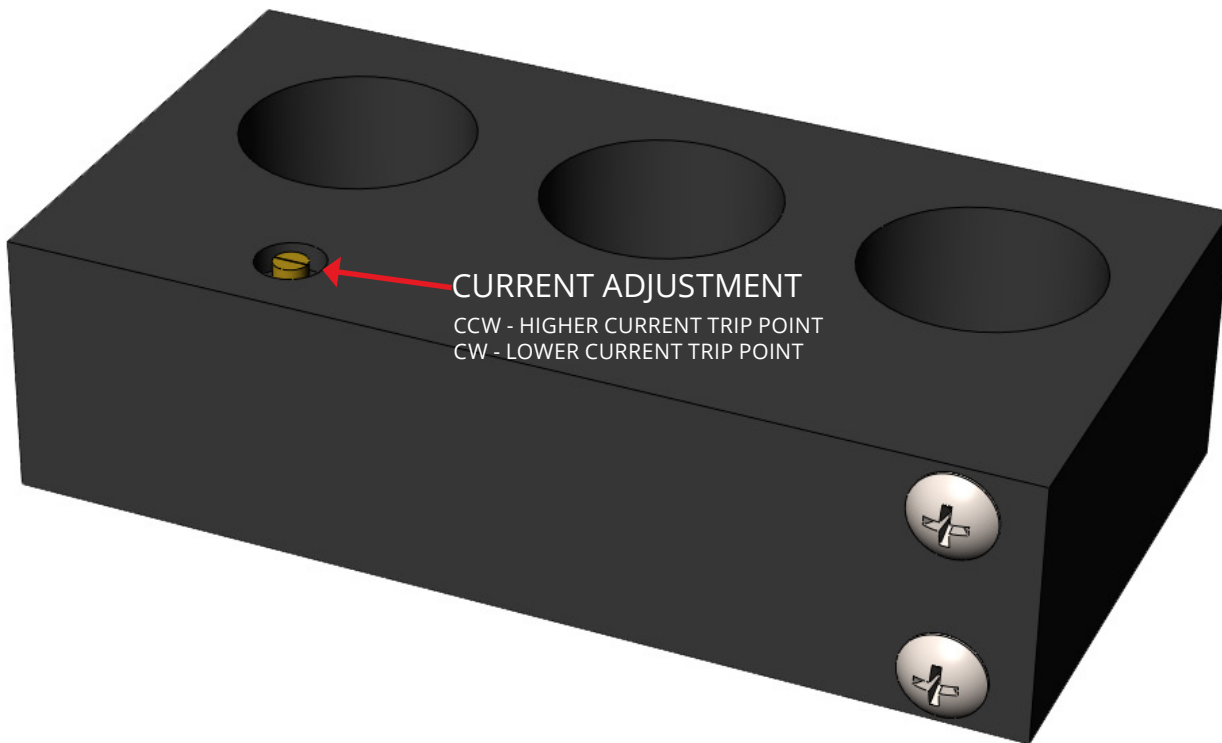
VARIABLE SPEED MOTOR CONTROLLER - PASTIME



HOPPER CIRCUIT BREAKER WIRING



CURRENT SENSOR ADJUSTMENT PROCEDURE



IF THE CONVEYOR DOES NOT START WHEN A PITCHING MACHINE IS ACTIVATED DO THE FOLLOWING:

Locate the adjustment screw as shown above.

Turn the adjustment screw clockwise with the machine running until the conveyor turns on.
(NOTE: there are 28 complete turns of adjustment on the screw, but the screw will never bottom out).

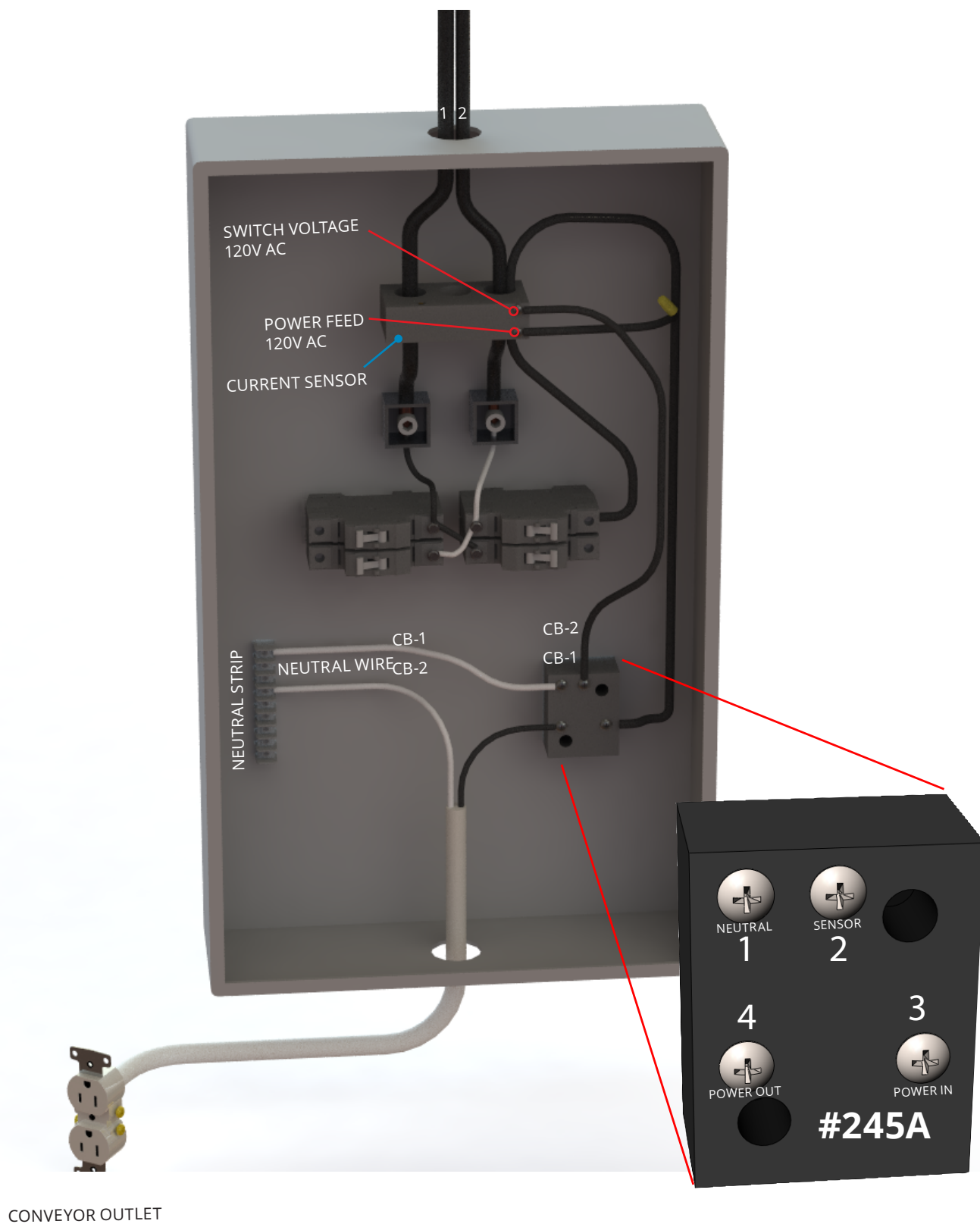
Once the conveyor turns on, manually delete the game by using the display panel for that cage and see if the conveyor turns off. If the conveyor does not turn off then turn the adjusting screw counter-clockwise until the conveyor stops, then turn the adjusting screw 5 complete revolutions clockwise.

IF THE CONVEYOR CONTINUALLY RUNS WITHOUT A PITCHING MACHINE ACTIVATED DO THE FOLLOWING:

Locate the adjustment screw as shown above.

Turn the adjustment screw counter-clockwise until the conveyor turns off.
(Note: there are 28 complete Turns of adjustment on the screw, but the screw will never bottom out).

Once the conveyor turns off activate a game and see if the conveyor turns on. If the conveyor does not turn on then turn The adjusting screw clockwise until the conveyor comes on, then turn the adjusting screw 5 complete revolutions counterclockwise.





IHS (SA) SYSTEM

CONTENTS IN THIS SECTION

SA-8 Ball & Coin Count programming instruction and button functions.....page 85

SA-8 Circuit board page 86

Overview of the IHS system.....page 87

SA-8 BALL & COIN COUNT PROGRAMMING INSTRUCTIONS & BUTTON FUNCTIONS

PROGRAMMING COIN & BALL INSTRUCTIONS

PROGRAMMING COINS:

NOTE: Before programming unplug power from Light Box, then plug power back in.

- 1) Push and hold the program button “P”
- 2) Push the coin button “C” 1 time for 1 coin, 2 times for 2 coins etc...
- 3) Release the program button when desired amount of coin inputs are achieved.

NOTE: If you push the coin button more than needed, release the program button and start over.

PROGRAMMING BALLS:

NOTE: Before programming unplug power from Light Box, then plug power back in.

- 1) Push and hold the program button “P”
- 2) Push the ball button “B” 1 time for 1 ball, 2 times for 2 balls etc...
- 3) Release the program button when desired amount of ball inputs are achieved.

NOTE: If you push the coin button more than needed, release the program button and start over.

PROGRAMMING TIME INCREMENTS:

NOTE: Rental times are preset for 15 minute increments.

- 1) Push and hold the program button
- 2) Push the “RENT” button 1 time for 5 minutes, 2 times for 10 minutes etc...
- Release the program button when desired amount of time inputs are achieved

GAME TIMED RENTALS:

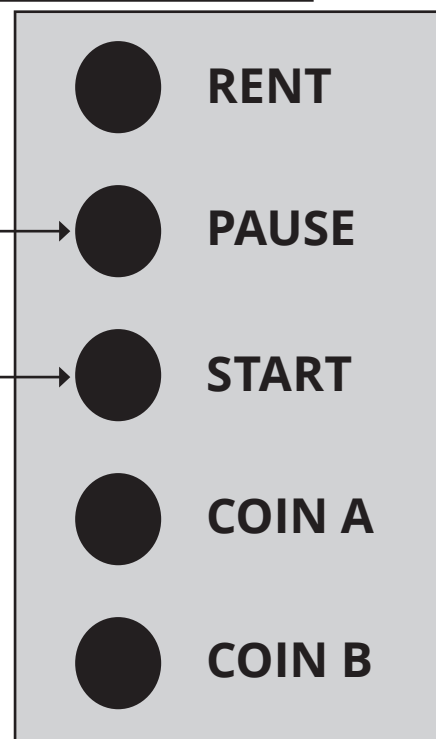
NOTE: Rental times are preset for 15 minute increments.

- 1) Push the “RENT” button 1 time for 15min. 2 times for 30min etc...
- 2) Press the “COIN A” button or “COIN B” button
- 3) Push the “START” button on coin box or Light Box to start game.
- 4) Game will pitch programmed balls and shut off and yellow light will flash, hit start button again to start another game. The start button will be active until time runs out.

DELETING A GAME

To delete a game in progress, Push and hold the “PAUSE” and “START” button at the same Time, as shown in the drawing Below.

DELETE

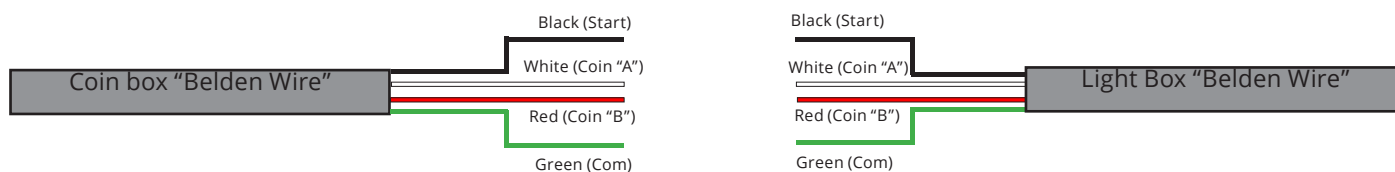


BUTTON FUNCTIONS

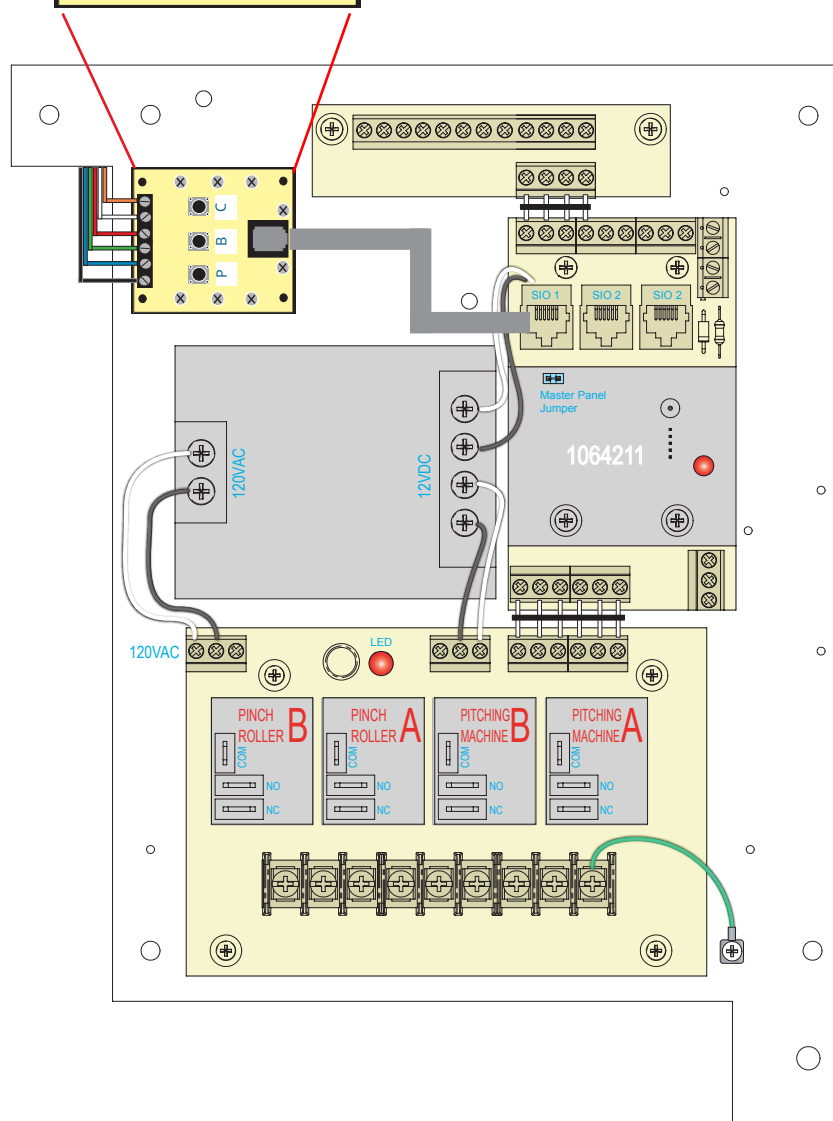
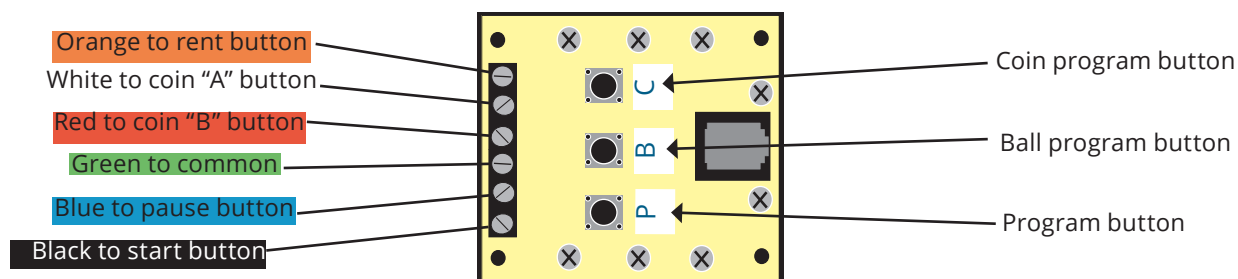
Rent	Activates/adds 5 min rental games.
Pause	Temporally disables game. “Push start to re-activate”
Start	Starts game after Rent/ Pause button is pressed.
Coin	Starts a manual game. (Same as coin activated game)

SA-8 CIRCUIT BOARD

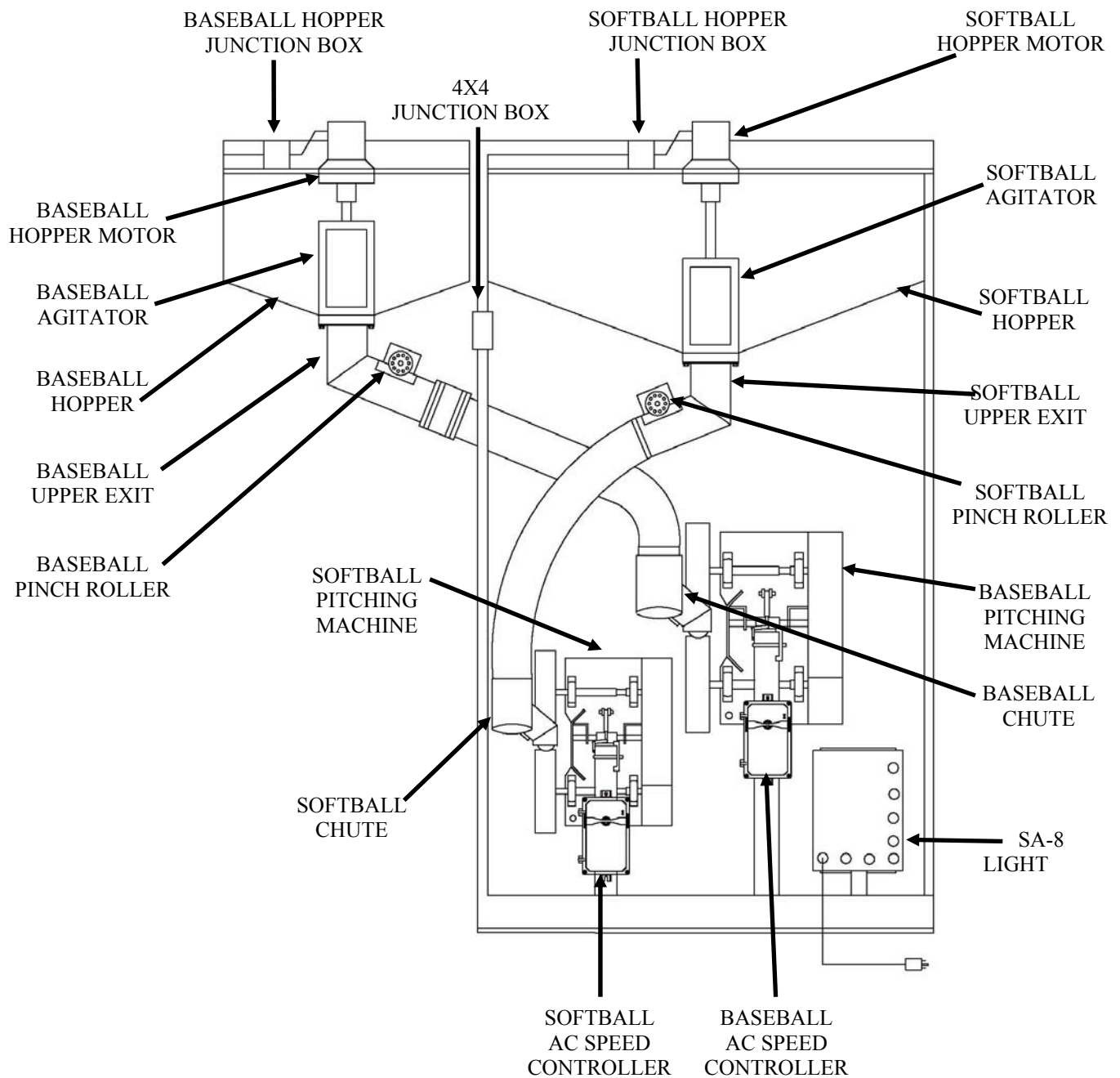
COIN BOX TO LIGHT BOX WIRING DIAGRAM



COIN MECH INTERFACE DIAGRAM



OVERVIEW OF THE IHS SYSTEM





CENTER POLE WINCH & COLLAR

CONTENTS IN THIS SECTION

Collar stops - main mast detail..... page 89

Cable & winch detail page 90

Center pole & winch max force detail page 91

Thern winch owners manual page 94

IMPORTANT SAFETY INFORMATION

WINCH & CENTER POLE COLLAR STOPS

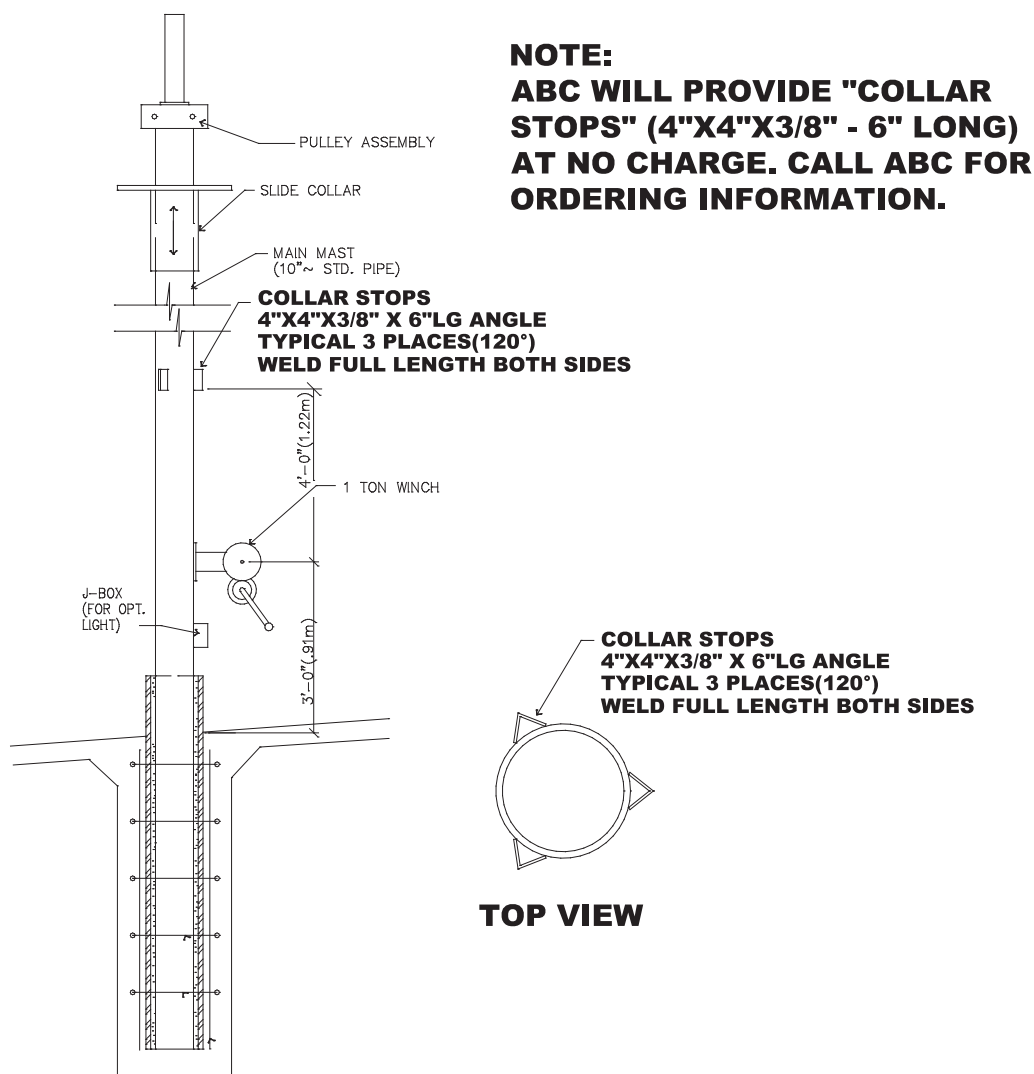
In All Cases, The Center Pole Winch And Collar Assembly Must Only Be Used With "Center Pole Collar Stops" Welded In Place On The Center Pole.

These Stops Should Have Been Welded Onto The Center Pole At The Initial Construction Phase. They Were (And Are) Illustrated On The Original "ABC" Construction Blue Prints And Illustrated In The Enclosed Drawing. "ABC" Will Provide These Collar Stops At No Charge. These Stops Work As An Emergency Collar Stop. Winches Should Never Be Used Without These Collar Stops! If These Stops Are Not In Place, Do Not Operate The Winch.

NOTICE:

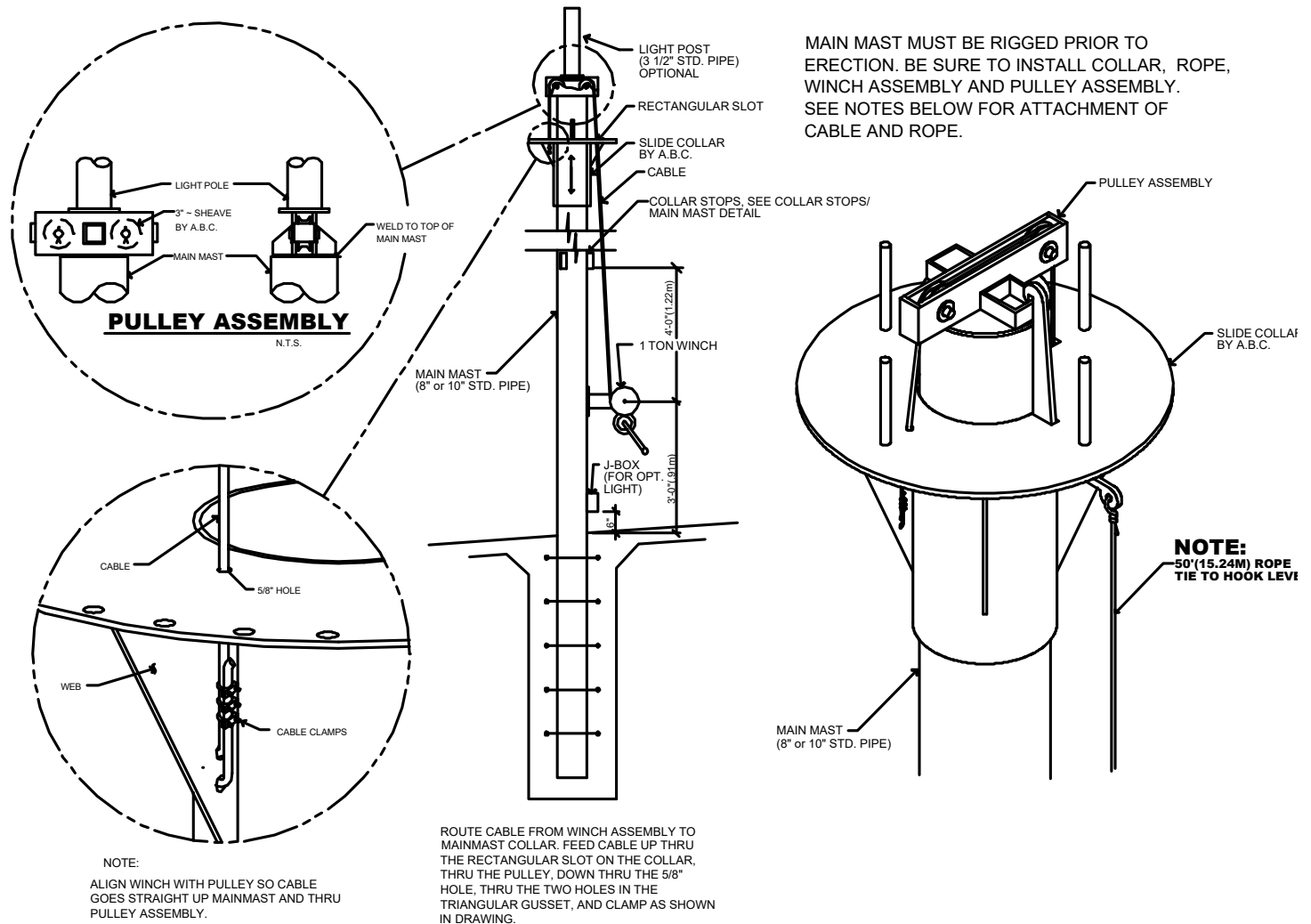
"ABC" has been offering to sell center pole winches and cables that we believe are of sufficient quality and of sufficient lifting capability. However, failures can occur which may result in the collar falling uncontrollably. Without center pole stops, serious injuries may result!

If you have any questions regarding the use, safety and operation of these winches or cables, contact your local OSHA inspector and/or local engineer to satisfy your concerns. Refer to pages 115-137 for drawings, connections details and load ratings.



COLLAR STOPS/MAIN MAST DETAIL

CABLE & WINCH

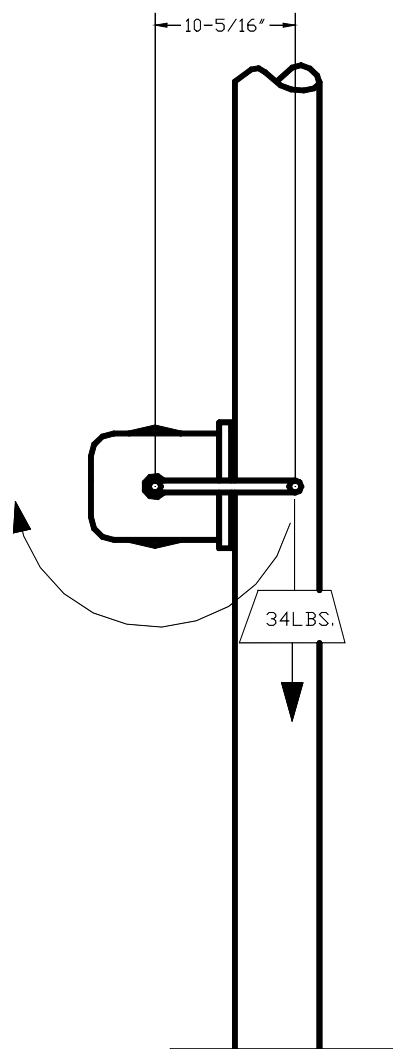
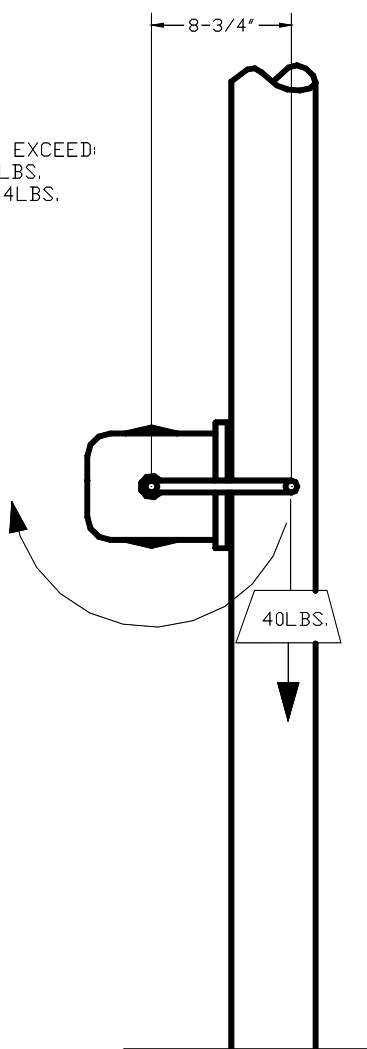


CABLE and WINCH DETAIL

CENTER POLE WINCH & COLLAR MAX FORCE

IMPORTANT

MAX FORCE ON HANDLE NOT TO EXCEED:
HANDLE LENGTH (8-3/4") = 40LBS.
HANDLE LENGTH (10-5/16") = 34LBS.

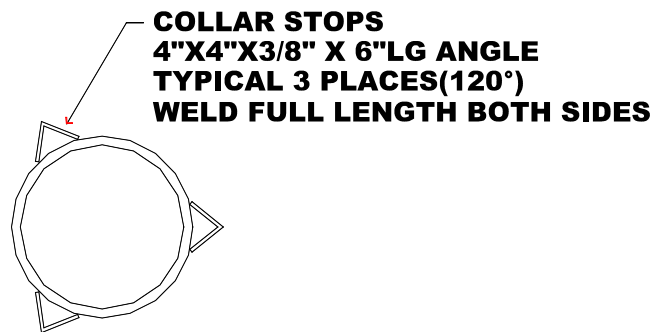
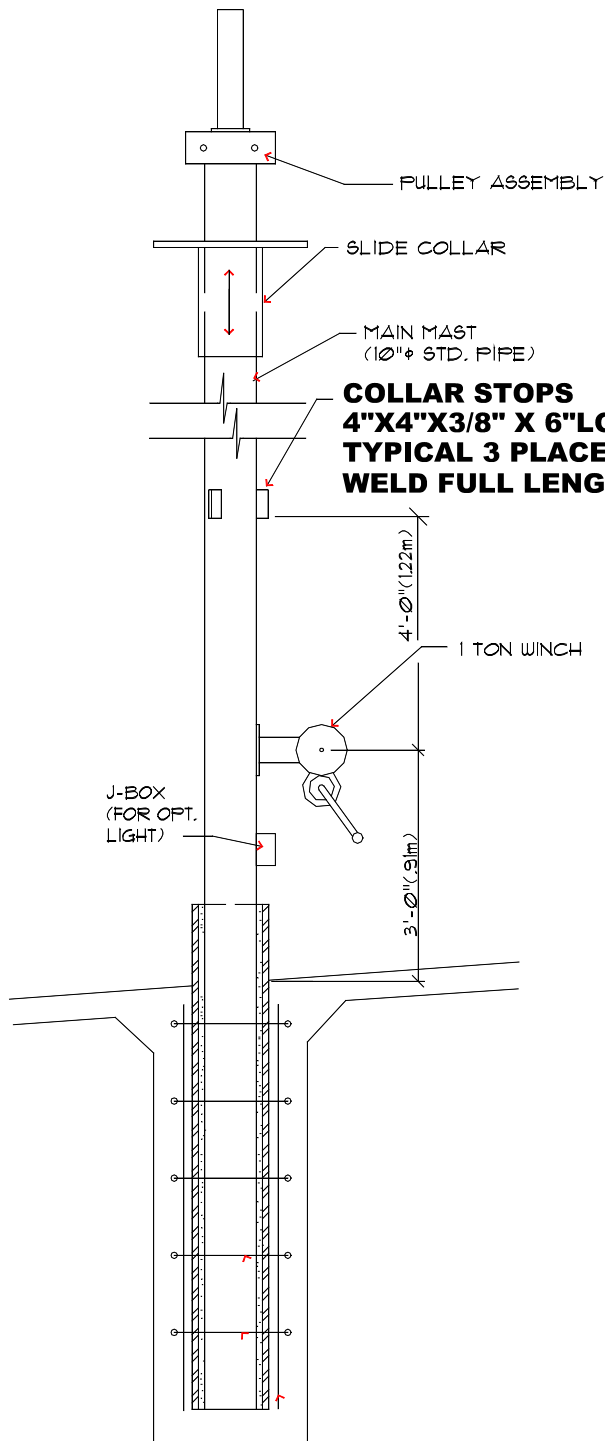


CAUTION:
IF YOU HAVE ANY PROBLEMS DETERMINING
MAXIMUM FORCE CALL ABC FOR HELP.

CENTER POLE WINCH & COLLAR

IMPORTANT

NOTE:
ABC WILL PROVIDE "COLLAR STOPS" (4"X4"X3/8" - 6" LONG)
AT NO CHARGE. CALL ABC FOR
ORDERING INFORMATION.

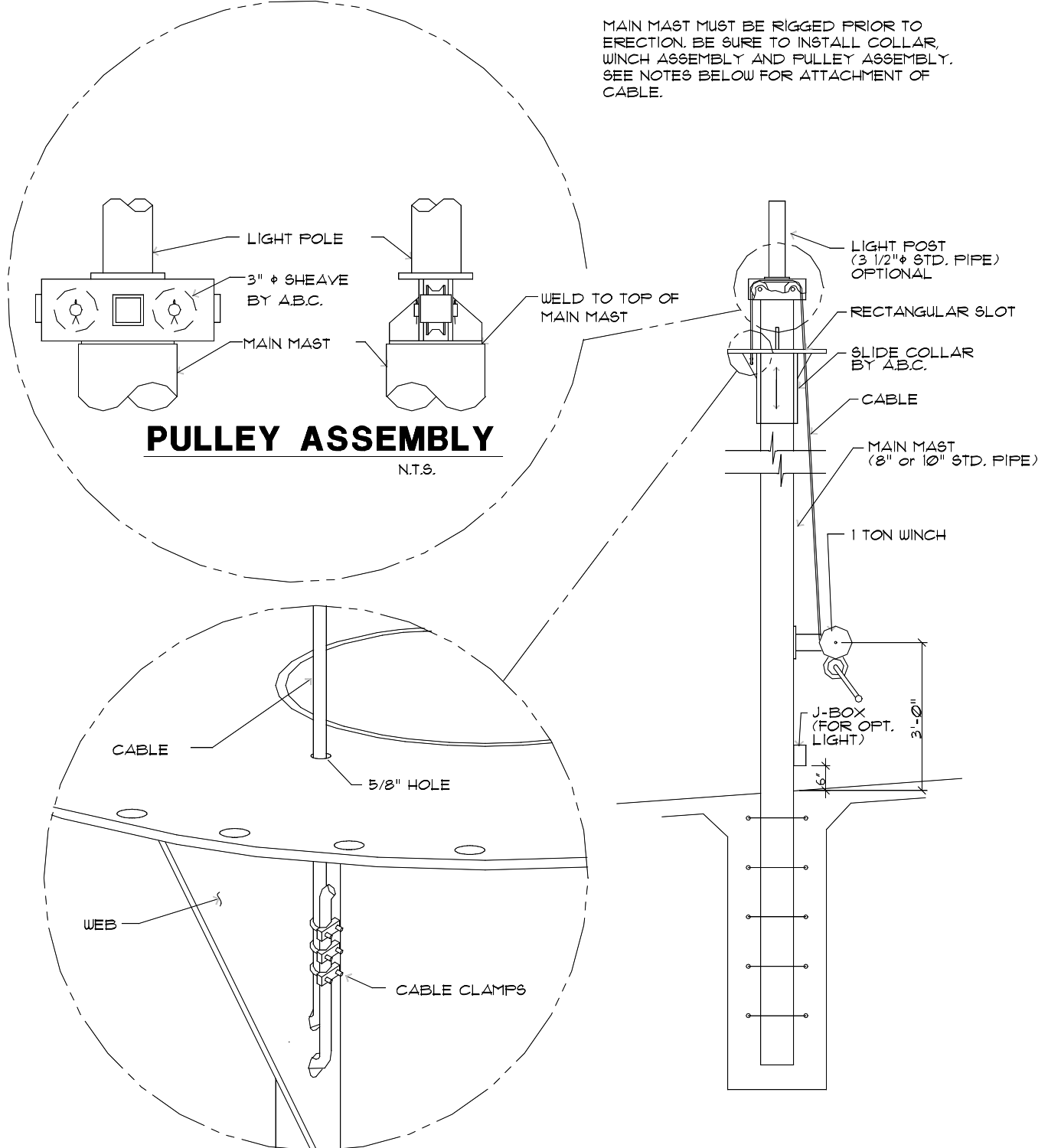


TOP VIEW

COLLAR STOPS/MAIN MAST DETAIL

CENTER POLE WINCH & COLLAR

MAIN MAST MUST BE RIGGED PRIOR TO ERECTION. BE SURE TO INSTALL COLLAR, WINCH ASSEMBLY AND PULLEY ASSEMBLY. SEE NOTES BELOW FOR ATTACHMENT OF CABLE.



NOTE:

ALIGN WINCH WITH PULLEY SO CABLE GOES STRAIGHT UP MAINMAST AND THRU PULLEY ASSEMBLY.

ROUTE CABLE FROM WINCH ASSEMBLY TO MAINMAST COLLAR. FEED CABLE UP THRU THE RECTANGULAR SLOT ON THE COLLAR, THRU THE PULLEY, DOWN THRU THE 5/8" HOLE, THRU THE TWO HOLES IN THE TRIANGULAR GUSSET, AND CLAMP AS SHOWN IN DRAWING.

CABLE and WINCH DETAIL

Thern Winch Manual



Read this Owner's Manual thoroughly before operating the equipment. Keep it with the equipment at all times. Replacements are available from Thern, Inc., PO Box 347, Winona, MN 55987, 507-454-2996. www.thern.com

IMPORTANT: Please record product information on page 2. This information is required when calling the factory for service.



Owner's Manual

For Thern Spur Gear Hand Winches

Two-Year Limited Warranty

Please record the following:

Date Purchased:

Model No.:

Code No.:

This information is required when calling the factory for service.

Thern, Inc. warrants its products against defects in material or workmanship for two years from the date of purchase by the original using buyer, or if this date cannot be established, the date the product was sold by Thern, Inc. to the dealer. To make a claim under this warranty, contact the factory for an RGA number. The product must be returned, prepaid, directly to Thern, Inc., 5712 Industrial Park Road, Winona, Minnesota 55987. The following information must accompany the product: the RGA number, the date of purchase, the description of the claimed defect, and a complete explanation of the circumstances involved. If the product is found to be defective, it will be repaired or replaced free of charge, and Thern, Inc. will reimburse the shipping cost within the contiguous USA.

This warranty does not cover any damage due to accident, misuse, abuse, or negligence. Any alteration, repair or modification of the product outside the Thern, Inc. factory shall void this warranty. This warranty does not cover any costs for removal of our product, downtime, or any other incidental or consequential costs or damages resulting from the claimed defects. This warranty does not cover brake discs, wire rope or other wear components, as their life is subject to use conditions which vary between applications.

FACTORY AUTHORIZED REPAIR OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE EXCLUSIVE REMEDY TO THE CONSUMER. THERN, INC. SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY ON THIS PRODUCT. EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ON THIS PRODUCT IS LIMITED IN DURATION TO THE DURATION OF THIS WARRANTY.

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

Note: Thern, Inc. reserves the right to change the design or discontinue the production of any product without prior notice.

About This Manual

The Occupational Safety and Health Act of 1970 states that it is the employer's responsibility to provide a workplace free of hazard. To this end, all equipment should be installed, operated, and maintained in compliance with applicable trade, industrial, federal, state, and local regulations. It is the equipment owner's responsibility to obtain copies of these regulations and to determine the suitability of the equipment to its intended use.

This Owner's Manual, and warning labels attached to the equipment, are to serve as guidelines for hazard-free installation, operation, and maintenance. They should not be understood to prepare you for every possible situation.

The information contained in this manual is applicable only to the Thern Spur Gear Hand Winches. Do not use this manual as a source of information for any other equipment.

The following symbols are used for emphasis throughout this manual:

⚠ WARNING

Failure to follow 'WARNING!' instructions may result in equipment damage, property damage, and/or serious personal injury.

⚠ CAUTION

Failure to follow 'CAUTION!' instructions may result in equipment damage, property damage, and/or minor personal injury.

Important!

Failure to follow 'important!' instructions may result in poor performance of the equipment.

Suggestions for Safe Operation

⚠WARNING

DO the following:

Read and comply with the guidelines set forth in this Owner's Manual. Keep this manual, and all labels attached to the winch, readable and with the equipment at all times. Contact Thern, Inc. for replacements.

Check lubrication before use.

Install the wire rope securely to the winch drum.

Keep at least 4 wraps of wire rope wound on the drum at all times, to serve as anchor wraps. With less than 4 wraps on the drum the wire rope could come loose, causing the load to escape.

Keep hands away from the drum, gears, wire rope, and other moving parts of the equipment.

Keep all unnecessary personnel away from winch while in operation. Keep out of the path of the load, and out of the path of a broken wire rope that might snap back and cause injury.

DO NOT do the following:

Do not lift people, or things over people. Do not walk or work under a load or in the line of force of any load.

Do not exceed the load rating of the winch or any other component in the system. To do so could result in failure of the equipment.

Do not use more than one winch to move a load that unless each winch was designed for use in a multiple winch system.

Do not operate with other than manual power.

Do not use damaged or malfunctioning equipment. To do so could result in failure of the equipment.

Do not modify the equipment in any way. To do so could cause equipment failure.

Do not wrap the wire rope around the load. This damages the wire rope and could cause the load to escape. Use approved rigging connectors to secure the wire rope to the load.

Do not operate the winch with guards removed or improperly installed.

Do not divert your attention from the operation. Stay alert to the possibility of accidents, and try to prevent them from happening.

Do not jerk or swing the load. Avoid shock loads by starting and stopping the load smoothly. Shock loads overload the equipment and may cause damage.

Do not lift loads or pull loads on an incline unless the winch is equipped with a brake.

Do not leave a suspended load unattended unless specific precautions have been taken to secure the load and keep people away from the winch and out from under the load.



1.1 Installing the Winch

Important!

- Inspect the winch immediately following installation according to the Instructions for Periodic Inspection. This will give you a record of the condition of the winch with which to compare future inspections.
- A qualified professional should inspect or design the foundation to insure that it will provide adequate support.
- Locate the winch so it will be visible during the entire operation.
- Do not weld the winch frame to the foundation or support structure. Welding the frame may void warranty, contact Thern, Inc. Use fasteners as instructed.

⚠ WARNING

Do not install the winch in an area defined as hazardous by the National Electric Code, unless installation in such an area has been thoroughly approved.

Do not install the winch near corrosive chemicals, flammable materials, explosives, or other elements that may damage the winch or injure the operator. Adequately protect the winch and the operator from such elements.

Position the winch so the operator can stand clear of the load, and out of the path of a broken wire rope that could snap back and cause injury.

Attach the winch to a rigid and level foundation that will support the winch and its load under all load conditions, including shock loading.

Install the wire rope securely to the winch drum. A poorly secured wire rope could come loose from its anchor and could release the load. See Figure 3.

- 1.1.1 CONSULT APPLICABLE CODES AND REGULATIONS for specific rules on installing the equipment.
- 1.1.2 LOCATE THE WINCH in an area clear of traffic and obstacles that could interfere with operation. Make sure winch is accessible for maintenance and operation.
- 1.1.3 MAINTAIN A FLEET ANGLE between 1/2 and 1-1/2 degrees. The proper fleet angle minimizes wire rope damage by helping the wire rope wind uniformly onto the drum. See Figure 1.
- 1.1.4 FASTEN THE WINCH securely to the foundation.
 - a FOR STANDARD PRODUCTS referred to in this manual, use 3/8 inch coarse thread fasteners, grade 5 or better. Torque for grade 5 fasteners without lubrication is 30 ft. lb. Make sure mounting holes are secured to a solid foundation able to support the winch and the load under all conditions with design factors based on accepted engineering practices.
 - b NON-STANDARD PRODUCTS that vary from the original design may have different fastening requirements. Contact a structural engineer or Thern, Inc. for this information.

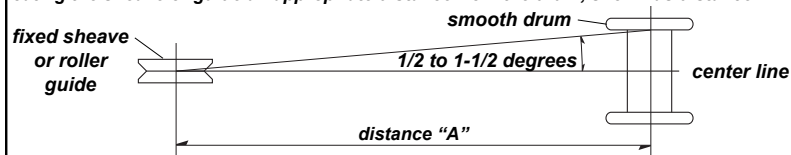
TO COMPLY WITH LOCAL CODES, CONTACT A QUALIFIED PROFESSIONAL TO OBTAIN PROPER STRUCTURE OR FOUNDATION SPECIFICATIONS FOR THE MOUNTING OF THERN PRODUCTS.

Important!

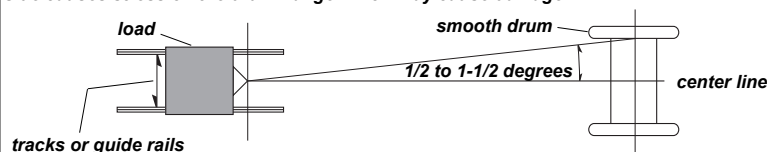
- Use a sheave or roller guide to direct the wire rope to the drum whenever possible.
- Install sheaves, tracks and other equipment so they will remain fixed under all load conditions. Follow the recommendations of the equipment manufacturer.
- Use sheaves of proper diameter to minimize wear on the wire rope. Follow the recommendations of the sheave manufacturer.

Figure 1 – Maintaining the Fleet Angle

When wire rope travels over a sheave or through a roller guide – maintain fleet angle by locating the sheave or guide an appropriate distance from the drum, shown as distance "A".

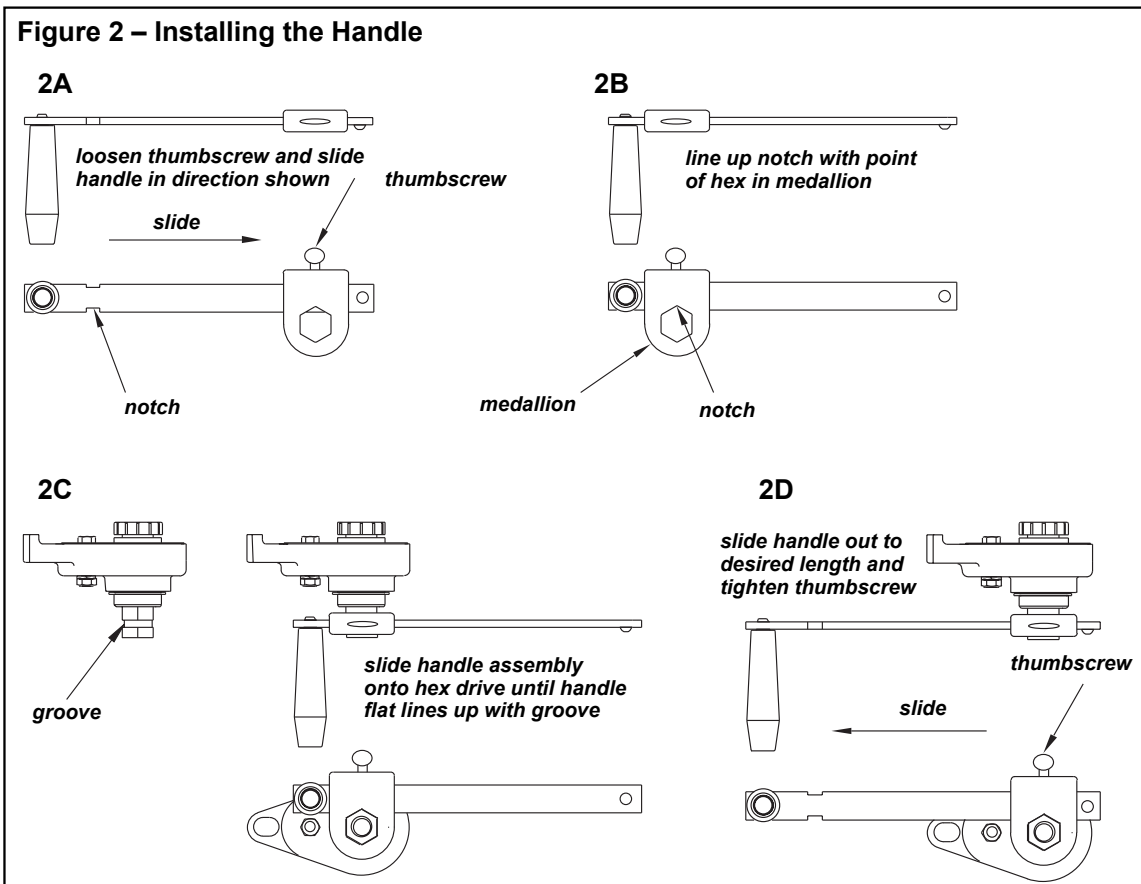


When wire rope travels directly to the load – maintain fleet angle by controlling side-to-side movement of the load with tracks or guide rails. Allowing the load to move too far to one side causes stress on the drum flange which may cause damage.



1.2 Installing the Handle

- 1.2.1 FOR MODELS M4022PB, M4032PB, M4042PBSS, M4312PB, M4312PBSS, and M4412PB equipped with PB Brakes, install the handle as follows:
- LOOSEN THE THUMBSCREW and slide the handle toward the medallion as shown. See Figure 2A.
 - LINE UP THE NOTCH in the handle with the point of the hex in the medallion. See Figure 2B.
 - SLIDE THE HANDLE AND MEDALLION ASSEMBLY onto the hex drive on the brake until the flat of the handle lines up with the groove in hex drive. See Figure 2C.
 - SLIDE THE HANDLE outward away from the medallion to the desired length and tighten the thumbscrew. See Figure 2D.
- 1.2.2 FOR MODELS M4022 AND M4032, place the handle assembly on the handle shaft and secure in place with the lock washer and hex nut.
- 1.2.3 FOR MODELS M4312 AND M4412, place the handle assembly on the drum shaft and install the hair pin cotter in the end of the drum shaft to hold the handle in place.



A8097G-0613

1.3 Installing the Wire Rope

Important!

- Use wire rope and other rigging equipment rated for the size of the largest load you will be moving.
- Do not drag the wire rope through dirt or debris that could cause damage, or poor operation.
- Always wear protective clothing when handling wire rope.

⚠WARNING

Install the wire rope so it is wound correctly as shown, or the winch will not work properly, and could release the load.

Install the wire rope securely to the winch drum. A poorly secured wire rope could come loose from its anchor and could release the load.

- 1.3.1 PURCHASE THE PROPER WIRE ROPE for your application. Keep the following in mind when selecting a wire rope. Contact a reputable wire rope supplier for help.

- a BREAKING STRENGTH of new wire rope should be at least 3 times greater than the largest load placed on the winch. If loads are lifted or pulled on an incline, the breaking strength must be at least 5 times greater than the largest load. These are minimum values and will vary with the type of load and how you are moving it.
- b WIRE ROPE LAY must agree with the winding direction of the drum to help insure proper winding.
- c WE RECOMMEND 7 x 19 galvanized aircraft cable for diameters up to 5/16 inch.

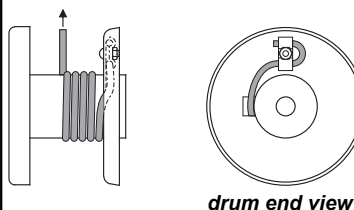
- 1.3.2 ANCHOR THE WIRE ROPE to the drum using either the flange clip or quick disconnect anchor.

- a FLANGE CLIP ANCHOR. See Figure 3A.
 - PASS THE END OF THE WIRE ROPE through the hole in the flange.
 - INSERT THE CARRIAGE BOLT, loop the wire rope around the bolt, and install the clip so the wire rope is held by the curves of the clip.
 - INSTALL THE JAM NUT and tighten it until the wire rope is flattened against the drum flange.
- b QUICK DISCONNECT ANCHOR. See Figure 3B.
 - PUSH THE END STOP through the large center hole in the drum flange.
 - PULL THE WIRE ROPE forward to lodge the end stop in the slot.

- 1.3.3 TURN THE HANDLE CLOCKWISE to wind wire rope onto the drum. If wire rope unwinds from the drum when the handle is rotated clockwise, the wire rope is installed incorrectly. **Install the wire rope correctly before continuing.**

- 1.3.4 WIND FOUR FULL WRAPS of wire rope onto the drum by operating the winch while holding the wire rope taught. **These wraps serve as anchor wraps and must remain on the drum at all times.**

Figure 3A – Flange Clip Anchor

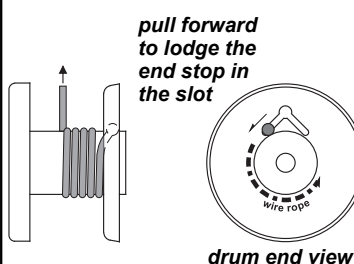


*typical installation shown
right lay – underwound**

**M4042PBSS is overwound*

*Wire rope assemblies can be
purchased from Thern, Inc.*

Figure 3B – Quick Disconnect Anchor



*typical installation shown
right lay – underwound**

**M4042PBSS is overwound*

*Wire rope assemblies can be
purchased from Thern, Inc.*

2.1 General Theory of Operation

Important!

- Limit nonuniform winding by keeping tension on the wire rope and by maintaining the proper fleet angle.
- It is your responsibility to detect and account for different factors affecting the condition and performance of the equipment.

- 2.1.1 THE PULL REQUIRED to move the load must not exceed the load rating of the winch. Consider the total force required to move the load, not the weight of the load.
- 2.1.2 THIS EQUIPMENT CAN develop forces that will exceed the load rating. It is the responsibility of the equipment user to limit the size of the load. Inspect the equipment regularly for damage according to the instructions contained in this manual.
- 2.1.3 USE A DISC BRAKE on all hand winches used to lift loads or pull loads on an incline.
- 2.1.4 PERFORMANCE RATINGS of the equipment are affected by the amount of wire rope wound on the drum, the way in which it is wound, and the way the winch is used.
- a DRUM CAPACITY depends on how tightly and evenly the wire rope is wound on the drum. Actual drum capacities are usually 25-30% less than values shown in performance Tables, due to loose winding and overlapping.
 - b FORCE REQUIRED TO LIFT the load increases with each additional layer of wire rope wound onto the drum. The value shown in performance Tables is based on an empty drum and maximum handle length.
 - c LOAD RATING represents the maximum pull that can be placed on new equipment. Load ratings are assigned values for specific amounts of load travel or wire rope accumulation. The load rating decreases as layers of wire rope accumulate on the drum.
- 2.1.5 DUTY RATINGS refer to the type of use the equipment is subject to. Consider the following when determining duty rating.
- a ENVIRONMENT: harsh environments include hot, cold, dirty, wet, corrosive, or explosive surroundings. **Protect the equipment from harsh environments when possible.**
 - b MAINTENANCE: poor maintenance, meaning poor cleaning, lubrication, or inspection, leads to poor operation and possible damage of the equipment. **Minimize poor maintenance by carefully following the instructions contained in this manual.**
 - c LOADING: severe loading includes shock loading and moving loads that exceed the load rating of the equipment. **Avoid shock loads, and do not exceed the load rating of the equipment.**
 - d FREQUENCY OF OPERATION: frequent or lengthy operations increase wear and shorten the life span of gears, bearings, and other components. **Increase maintenance of the equipment if used in frequent operations.**
- 2.1.6 AIRBORNE NOISE EMISSIONS vary depending on load and the type of winch being used. Standard configurations do not typically exceed a sound pressure level of 80dB(A) at workstations.

CONTACT THE FACTORY FOR MORE INFORMATION.

2.2 Breaking-In the Winch

- 2.2.1 BREAK-IN OCCURS during the first 10 hours of normal operation. During break-in, mating surfaces become polished, and clearances increase. This is desired for efficient operation of bearings and gears.
- 2.2.2 INSPECT THE WINCH following break-in according to the Instructions for Periodic Inspection.

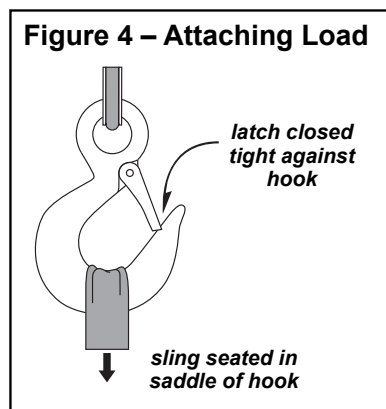
2.3 Preparing for Operation

Important!

- When determining whether the load will exceed the load rating, consider the total force required to move the load.

- 2.3.1 CONSIDER THE OPERATION. Do not begin until you are sure you can perform the entire operation without hazard.
- 2.3.2 INSPECT ALL COMPONENTS of the system.
 - a INSPECT THE WINCH and other equipment according to the Instructions for Frequent Inspection.
 - b OPERATORS must be in good health, alert, thoroughly trained in operating the equipment, and properly clothed (hard hat, safety shoes and safety glasses, no loose clothing).
 - c THE LOAD must be clear of other objects and free to move. Make sure the load will not tip, spin, roll away, or in any way move uncontrollably.
- 2.3.3 KNOW YOUR LOAD and make sure you do not exceed the load rating of the winch or any other equipment in the system.

2.4 Attaching the Load



⚠ WARNING

Do not wrap the wire rope around the load. This damages the wire rope and could cause the load to escape. Use a sling or other approved lifting device.

- 2.4.1 CLEAR OBJECTS from the path of the load so you can move it freely and observe it at all times during the operation.
- 2.4.2 ATTACH THE LOAD using a nylon sling, or other approved lifting device. Follow the recommendations of the sling manufacturer.
 - a SEAT THE SLING in the saddle of the hook with the hook latch completely closed. See Figure 4.
 - b CENTER THE LOAD on the hook so it will remain balanced and not tip or rotate to one side.

2.5 Moving the Load

Important!

- Obey a stop signal from anyone.
- Maintain tension on the wire rope to keep it tightly and evenly wound on the drum.
- If the winch and load are not visible during the entire operation, get help from another person.
- Appoint a supervisor if more than one person is involved in the operation. This will reduce confusion and increase safety.
- When lifting a load, use a tag line to keep the load from swinging or twisting, while keeping yourself away from the load.
- Remove the winch handle when the winch is not in use, to help avoid unauthorized use.

- 2.5.1 MOVE THE LOAD slowly and smoothly, only a small distance at first. Make sure the load is balanced and securely attached before continuing.
- 2.5.2 TURN THE HANDLE CLOCKWISE to wind wire rope onto the drum. If wire rope unwinds from the drum when the handle is rotated clockwise, the wire rope is installed incorrectly. **Install the wire rope correctly before continuing.**
- 2.5.3 OBSERVE THE WIRE ROPE as it winds onto the drum. If it becomes loose, uneven, or overlapped, stop the operation and rewind the wire rope before continuing. **Continued operation with overlapped or uneven wire rope can damage the wire rope and shorten its life.**
- 2.5.4 FOR MODELS M4312 AND M4412 ONLY. Move the handle to the countershaft to quickly wind or unwind UNLOADED wire rope. **Do not attempt to move a load with the handle installed on the countershaft.**
- 2.5.5 FOR MODELS M4022, M4032, M4312 AND M4412 ONLY. Engage the ratchet when winding wire rope onto the drum, disengage the ratchet to unwind the wire rope. **DO NOT ENGAGE THE RATCHET while the winch gears are turning.** Stop the winch before engaging the ratchet. Disengage the ratchet by moving the load slightly to remove pressure from the ratchet, then pull out and turn the ratchet knob 90 degrees. Grip the handle tightly at all times during operation. If you release the handle the load may backdrive causing the handle to spin. **Do not try to stop a spinning handle, step clear until the spinning stops.**
- 2.5.6 MOVE THE LOAD slowly and smoothly, only a small distance at first. Make sure the load is balanced and securely attached before continuing.
- 2.5.7 OBSERVE THE WIRE ROPE as it winds onto the drum. If it becomes loose, uneven, or overlapped, stop the operation and rewind the wire rope before continuing. Continued operation with overlapped or uneven wire rope can damage the wire rope and shorten its life.

3.1 Cleaning the Winch

Important!

Increase the frequency of maintenance procedures if the winch is:

- Operated for long periods.
- Used to pull heavy loads.
- Operated in wet, dirty, hot, or cold surroundings.

- Clean the winch to remove dirt and help prevent rust and corrosion.
- 3.1.1 CLEAN THE WINCH every six months or whenever it is dirty.
 - a WIPE ALL EQUIPMENT to remove dirt and grease.
 - b LEAVE A LIGHT FILM of oil on all surfaces to protect them against rust and corrosion.
 - c WIPE OFF excessive amounts of oil to avoid the accumulation of dirt.
 - 3.1.2 REMOVE ALL UNNECESSARY OBJECTS from the area surrounding the winch.

3.2 Lubricating the Winch

Important!

- Make sure lubricant has a temperature rating appropriate for the ambient temperatures of the operation.

- CAUTION**

Do not over lubricate the brake bushings on models equipped with a brake. Over lubricating may cause oil to leak onto the friction discs, which may damage the friction discs or result in poor operation of the disc brake.

Lubricate the spur gears before each operation, and periodically during operation. Failure to lubricate the gears will cause damage or deformation of gear teeth.
- Lubricate the winch properly to help protect it from wear and rust. Read the following instructions carefully.
- 3.2.1 CONSULT MANUFACTURER'S RECOMMENDATIONS for specific information on lubricating the wire rope and other equipment.
 - 3.2.2 LUBRICATE WINCH BEARINGS AND SHAFTS at least every 6 months.
 - a APPLY 2 TO 3 DROPS of SAE 30 non-detergent oil to bearings and shafts at all friction points.
 - b ROTATE THE DRUM several times to allow the oil to penetrate, and wipe off excess oil to avoid accumulation of dirt.
 - 3.2.3 LUBRICATE WINCH GEARS before every operation and at least every 10 hours during operation.
 - a APPLY A LIGHT FILM of open gear lubricant to the gear teeth on all gears.
 - b USE SPRAYON S00201 or equivalent open gear lube. For dirty conditions use a dry lubricant such as dry graphite or Moly.
 - 3.2.4 LUBRICATE THE DISC BRAKE IF APPLICABLE at least every 6 months. Place 1 or 2 drops of SAE 30 non-detergent oil into the hole in the brake housing marked "oil", and turn the brake several times to allow the oil to penetrate.
 - 3.2.5 LUBRICATE THE WIRE ROPE and other equipment by following the manufacturer's recommendations.

3.3 Inspecting the Equipment

Important!

- Start an inspection program as soon as you put the winch into use.
- Appoint a qualified person to be responsible for regularly inspecting the equipment.
- Keep written records of inspection. This allows comparison with comments from previous inspections so you can see changes in condition or performance.

Perform frequent inspections:

- Before each operation.
- Every 3 hours during operation.
- Whenever you notice signs of damage or poor operation.

Frequent Wire Rope Inspection:

- Use ASME B30.7 as a guideline for rope inspection, replacement and maintenance.
- Check the wire rope, end connections and end fittings for corrosion kinking, bending, crushing, bird-caging or other signs of damage.
- Check the number, distribution and type of visible broken wires. See paragraph 3.3.4 b and Figure 5.
- Check the wire rope for reduction of rope diameter from loss of core support, or wear of outside wires. See Figure 7.
- Take extra care when inspecting sections of rapid deterioration such as sections in contact with saddles, sheaves, repetitive pickup points, crossover points and end connections.

⚠ WARNING

Do not use damaged or malfunctioning equipment. Place an “OUT OF ORDER” sign on the winch. Do not use the winch until the sign is removed by a qualified maintenance person who has completely corrected the problem.

Inspect the winch to detect signs of damage or poor operation before they become hazardous.

- 3.3.1 CONSULT APPLICABLE CODES AND REGULATIONS for specific rules on inspecting the winch and other equipment.
- 3.3.2 CONSULT MANUFACTURER'S RECOMMENDATIONS for information on inspecting the wire rope and other equipment.

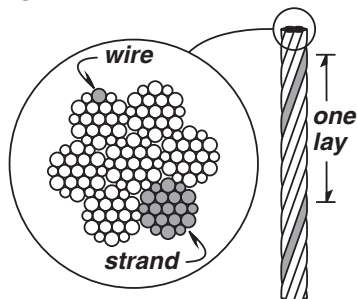
3.3.3 Instructions for Frequent Inspection

- a VISUALLY INSPECT the entire winch and all other equipment involved in the operation.
- Check all equipment for cracks, dents, bending, rust, wear, corrosion and other damage.
 - Make sure the wire rope is installed correctly and anchored securely to the drum.
 - Make sure the winch and brake are properly lubricated.
 - Make sure fasteners are installed to securely hold the handle in place.
 - Make sure mounting fasteners are tightened securely.
 - Make sure the foundation is in good condition, and capable of supporting the winch and its load under all load conditions.
- b TEST WINCH PERFORMANCE by operating the winch with a load not exceeding the load rating.
- Listen for unusual noises, and look for signs of damage as you operate the winch.
 - Make sure the wire rope winds evenly and tightly onto the drum. If it is loose or uneven, rewind it before continuing.
 - Make sure the handle rotates freely in both directions.
 - Make sure the load moves smoothly without hesitation or strain.
 - On models equipped with a ratchet, make sure the ratchet engages and disengages completely.
 - On models equipped with a brake, make sure the disc brake ratchet pawl clicks firmly as the brake handle is turned clockwise.
 - On models equipped with a brake, check the brake. Raise the load, then lower it and stop it a few feet off the ground. If the load continues to coast or creep under normal operating conditions, the friction discs may be worn and in need of replacement. Contact the factory.

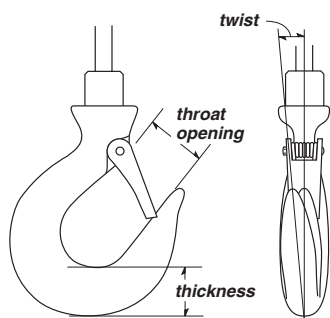
Completely correct all problems before continuing. Use the Troubleshooting Chart to help determine the cause of certain problems. See Table 2.

Perform periodic inspections:

- Every 6 months.
- Whenever you return the winch to service from storage.
- Whenever you notice damage or poor operation in a frequent inspection.
- Whenever you have, or think you may have, overloaded or shock loaded the winch.

Figure 5 – Broken Wires

Wire rope assembly must be replaced if more than 6 wires are broken in one lay, or if more than 3 wires are broken in one strand in one lay.

Figure 6 – Load Hook Inspection

The wire rope assembly must be replaced if the throat opening is 15% wider than nominal, if the thickness is 10% less than nominal, or if the hook is twisted 10° or more.

3.3.4 Instructions for Periodic Inspection, see Table 1.**a VISUALLY INSPECT the winch and all other equipment.**

- Disassembly may be required in order to properly inspect individual components. Contact factory for assembly/disassembly instructions. Disassembly of the winch or brake before contacting Thern, Inc. voids all warranties.
- Check the finish for wear, flaking, or other damage.
- Check all equipment, including wire rope for cracks, dents, bending, rust, wear, corrosion and other damage. If the winch was overloaded, or if you notice cracks and other signs of overloading and damage promptly remove equipment from use and have it repaired or replaced. **DO NOT CONTINUE TO USE DAMAGED OR OVERLOADED EQUIPMENT OR WIRE ROPE.**
- Check all fasteners for stripped threads, wear, bending, and other damage.
- Check the foundation for cracks, corrosion, and other damage.
- Make sure the winch and brake are properly lubricated.
- Make sure all labels and plates are readable, firmly attached, free of damage and clean. Replacements are available from the factory.

b REMOVE THE WIRE ROPE entirely from the drum.

- Always wear protective clothing when handling wire rope.
- Check the entire length of wire rope for bent wires, crushed areas, broken or cut wires, corrosion, and other damage. Carefully inspect areas that pass over sheaves or through roller guides.
- Note the location and concentration of broken wires. Replace wire rope if more than 6 wires are broken in one lay, or more than 3 wires are broken in one strand in one lay. See Figure 5.
- Make sure the load hook or other device is securely attached to the wire rope, and the wire rope where it is attached is not frayed, corroded, broken, or otherwise damaged.
- Measure the throat opening, thickness, and twist of the hook. Replace the hook if it shows signs of damage. See Figure 6.
- Make sure hook latch opens without binding and closes when released.
- Check the anchor holes in the drum flange for signs of wear or distortion.

c PLACE enough weight to keep the wire rope straight and tightly drawn.

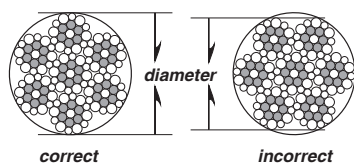
- Measure the diameter of the wire rope, especially in areas where wear is noticeable. Replace the wire rope if the diameter measures below the minimum diameter at any point. See Figure 7.

d REMOVE THE WINCH from the foundation.

- Check fasteners for stripped threads, wear, bends, and other damage.
- Check the frame for bending, distortion, cracks and other damage. A bent frame is caused by overloading, and is a sign that your application may require a winch with a larger load rating.

e MOVE THE DRUM with your hands.

- Check for excessive movement indicating worn or loose gears, bearings, or shafts.

Figure 7 – Rope Diameter

The wire rope assembly must be replaced if the diameter measures less than the minimum diameter at any point.

wire rope diameter	minimum diameter
1/8 in	7/64 in (.1094 in)
3/16 in	11/64 in (.1719 in)
1/4 in	15/64 in (.2344 in)
5/16 in	19/64 in (.2969 in)

- f FASTEN THE WINCH securely to the foundation.
- g INSTALL THE WIRE ROPE.
- h TEST WINCH PERFORMANCE by operating the winch with a load equal to the load rating.
 - Listen for unusual noises, and look for signs of damage as you operate the winch.
 - Make sure the wire rope winds evenly and tightly onto the drum. If it is loose or uneven, rewind it before continuing.
 - Observe the rotating drum, look for signs of loose or misaligned bearings.
 - Make sure the handle rotates freely in both directions.
 - Make sure the load moves smoothly without hesitation or strain.
 - On models equipped with a ratchet, make sure the ratchet engages and disengages completely.
 - On models equipped with a brake, make sure the disc brake ratchet pawl clicks firmly as the brake handle is turned clockwise.
 - On models equipped with a brake, check the brake. Raise the load, then lower it and stop it a few feet off the ground. If the load continues to coast or creep under normal operating conditions, the friction discs may be worn and in need of replacement. Contact the factory.

Completely correct all problems before continuing. Use the troubleshooting chart to help determine the cause of certain problems. See Table 2.

Table 1 – Inspection Checklist

checked boxes indicate damage or problem in need of repair

	damages	problems
general	☐ finish weathered, flaking, otherwise damaged ☐ parts cracked, bent, rusted, worn, otherwise damaged	☐ winch jerks or hesitates during operation ☐ unusual noises, other signs of malfunction
fasteners	☐ stripped threads, bent, worn, otherwise damaged	☐ loose, not tightened to proper torque
gears	☐ excessively worn, cracked, corroded, otherwise damaged	☐ loose or improperly lubricated
ratchet	☐ ratchet corroded, cracked, worn, otherwise damaged	☐ ratchet does not engage or disengage
brake assembly	☐ brake corroded, cracked, worn, otherwise damaged	☐ brake does not operate properly
drum	☐ anchor hole worn, distorted, otherwise damaged	☐ excessive movement or backlash
wire rope	☐ bent, crushed, otherwise damaged ☐ broken wires, see Figure 5 replace if more than 6 wires in one lay, or 3 wires in one strand in one lay, are broken ☐ diameter reduced, see Figure 7 replace if diameter is excessively worn	☐ wire rope loosely or unevenly wound number per strand = number per lay = diameter =
end connections	☐ corroded, rusted, worn, otherwise damaged	☐ not securely attached
load hook	☐ twisted, bent, worn, otherwise damaged, see Figure 6 replace if twist is 10 degrees or more replace if throat width is 15% larger than nominal replace if thickness is 10% less than nominal	☐ hook latch fails to close when released twist = throat width = thickness =
labels and plates	☐ dirty, illegible, otherwise damaged	☐ loosely attached or missing
comments:		
authorized signature: _____		date: _____

INFORMATION ON THIS PAGE IS SUPPLIED BY MANUFACTURER & NOT VERIFIED BY ABC

Important!

- It is your responsibility to determine when to replace parts. When considering whether to continue using a part or to replace it, remember that replacing it is the best way to avoid further equipment damage.
- Replace all spring pins and retaining rings when you disassemble the winch or brake for repair or replacement.
- Appoint a qualified person to be responsible for all repairs to the equipment.

3.4 Repairing the Winch

- 3.4.1 GET FACTORY AUTHORIZATION for all repairs. Unauthorized repairs will void the warranty, and may lead to damage or failure of the winch.
- 3.4.2 REPLACE DAMAGED OR POORLY OPERATING PARTS with Thern repair parts.
- 3.4.3 REFINISH AREAS where the paint is worn or flaking. A good finish helps to protect against corrosion and weather damage.
 - a REMOVE THE FINISH from damaged areas, down to the bare metal.
 - b CLEAN THE AREA thoroughly.
 - c REPAINT with a high quality primer and finishing coat.
- 3.4.4 TO ORDER REPAIR PARTS, contact your local dealer. Include the following information when ordering:
 - model number
 - serial number (or code number)
 - part number
 - date purchased, and from whom
 - description of what happened, or what is wrong
 - your name and return address

Important!

- Keep a record of what you ship, and when you send it.

4.1 Transporting the Winch

- 4.1.1 PACK THE WINCH using the original packaging materials, if possible.
- 4.1.2 SEAL THE WINCH in plastic with a desiccant to help protect it from rust, corrosion, and other damage.
- 4.1.3 INSPECT THE WINCH according to the Instructions for Periodic Inspection before installing it in a new location.

4.2 Storing the Winch

- 4.2.1 SEAL THE WINCH in plastic with a desiccant to help protect it from rust, corrosion, and other damage.
- 4.2.2 STORE THE WINCH in a cool clean place away from corrosive chemicals and moisture.
- 4.2.3 ROTATE THE DRUM periodically to keep bearing and gear surfaces from becoming lacquered.
- 4.2.4 INSPECT THE WINCH according to the Instructions for Periodic Inspection before installing it for operation.

Table 2 – Troubleshooting Chart

Contact the factory for detailed instructions if you are required to disassemble the winch or brake for any reason. Disassembly of the winch or brake before contacting Thern, Inc. voids all warranties.

problem	cause	correction
handle turns, drum doesn't turn	• loose or broken spring pins • loose, stripped or broken gears	- inspect winch and brake, repair as necessary - inspect gears and repair as necessary
handle turns hard or not at all	• ratchet on winch engaged • load too heavy • spring pins loose or broken on winch or brake. • disc brake damaged or locked • gears or bearings broken or locked	- disengage winch ratchet - lighten load - inspect winch and brake, repair as necessary - inspect brake, repair as necessary - inspect and repair as necessary
brake does not operate properly	• friction discs worn or damaged. • friction discs damaged from over lubrication • disc brake ratchet pawl damaged.	- inspect and replace as necessary - inspect and replace as necessary - inspect and repair as necessary
excessively worn gears or bearings (excessive backlash)	• load too heavy • poor lubrication of gears or bearings	- lighten load - inspect and relubricate as necessary
overheating	• operated too long without rest • load too heavy • poor lubrication. • bearing seized up.	- allow to cool - lighten load - inspect and lubricate as necessary - inspect and replace as necessary
unusual noises		
high pitched squeak	• poor lubrication.	inspect and relubricate as necessary
grinding noise	• contaminated lubrication • dirt in brake or winch gears • broken gears or bearings	- clean and relubricate winch - inspect and clean as necessary - inspect and replace as necessary
rattling noise	• loose bolts, set screws or other fasteners	tighten all bolts and other fasteners
uneven clicking noise in brake	• broken gear tooth in brake	inspect and repair as necessary
weak clicking noise in brake	• spring or ratchet pawl dirty or damaged • worn brake ratchet pawl, gear, or spring	- inspect and clean or repair as necessary - inspect and replace as necessary
no clicking noise in brake	• ratchet incorrectly installed. • ratchet pawl damaged or worn excessively	- disassemble and install correctly - inspect and replace as necessary

Spur Gear Hand Winch Performance Characteristics¹

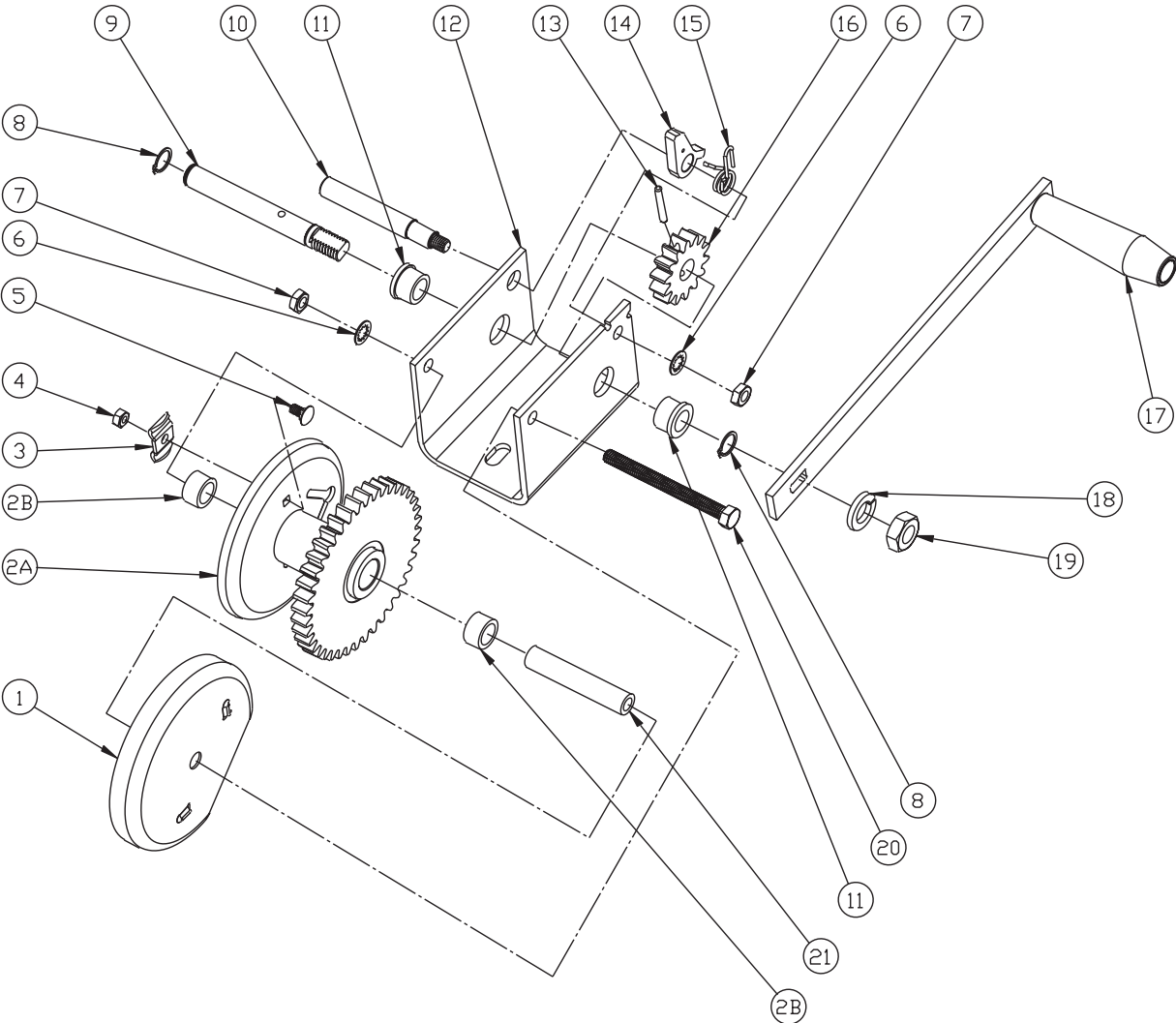
model number	description	load rating (lb)			wire rope dia. (in)	drum capacity (ft) ²			single gear ratio	double gear ratio	force ³ to lift 1000 lb	approx. ship wt. (lb)
		1st layer	mid drum	full drum		1st layer	mid drum	full drum				
M4022	1000 lb – marine duty (for pulling only)	1000	700	500	1/8 3/16	4 3	52 26	130 57	2.85:1	—	40 lb	12
M4022PB	1000 lb – marine duty with brake (for lifting)	1000	700	500	1/8 3/16	4 3	52 26	130 57	2.85:1	—	41 lb	17
M4032	1000 lb – marine duty (for pulling only)	1000	700	500	1/8 3/16	11 7	110 51	250 110	2.85:1	—	40 lb	14
M4032PB	1000 lb – marine duty with brake (for lifting)	1000	700	500	1/8 3/16	11 7	110 51	250 110	2.85:1	—	41 lb	18
M4042PBSS	1000 lb – stainless steel with brake (for lifting)	1000	800	600	1/8 3/16 1/4	12 8 5	110 48 27	240 110 59	3.83:1	—	46 lb (single gear)	24
M4312	2000 lb – marine duty (for pulling only)	2000	1600	1200	3/16 1/4 5/16	8 5 4	48 27 17	110 59 39	3.83:1	14.7:1	20 lb (double gear)	23
M4312PB	2000 lb – marine duty with brake (for lifting)	2000	1600	1200	3/16 1/4 5/16	8 5 4	48 27 17	110 59 39	—	14.7:1	17 lb (double gear)	28
M4312PBSS	2000 lb – stainless steel with brake (for lifting)	2000	1600	1200	3/16 1/4 5/16	8 5 4	48 27 17	110 59 39	—	14.7:1	17 lb (double gear)	28
M4412	2000 lb – marine duty (for pulling only)	2000	1600	1200	3/16 1/4 5/16	18 14 11	97 52 35	210 120 77	3.83:1	14.7:1	20 lb (double gear)	25
M4412PB	2000 lb – marine duty with brake (for lifting)	2000	1600	1200	3/16 1/4 5/16	18 14 11	97 52 35	210 120 77	—	14.7:1	17 lb (double gear)	30

¹ Performance Characteristics are for standard products referred to in this manual. Non-standard products may vary from the original design. Contact Thern, Inc. for this information.

² Actual drum capacities may be 25-30% less, due to nonuniform winding. Wire rope tension will also affect drum capacity.

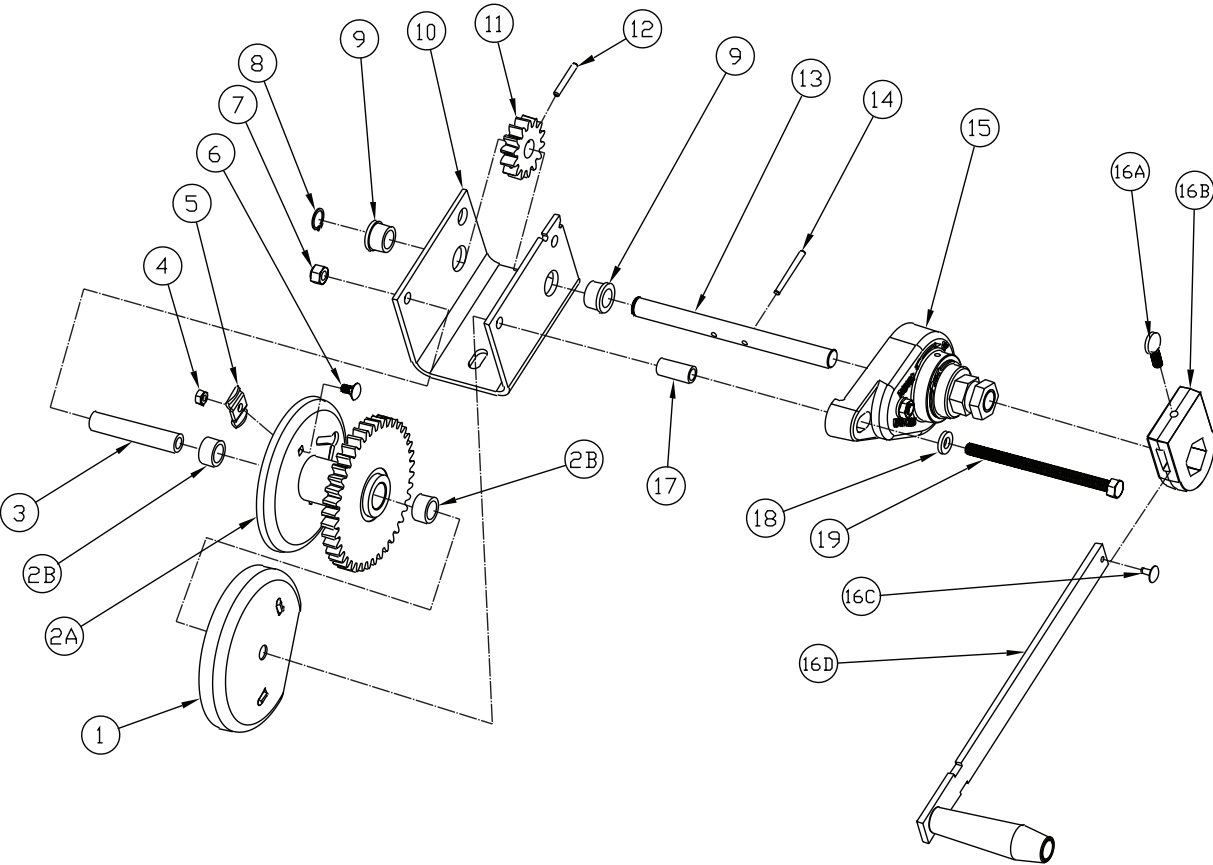
³ Approximate handle force required to lift 1000 lb with an empty drum, and maximum handle length.

Spur Gear Hand Winch		Model M4022		Model M4032	
item	description	part number	qty.	part number	qty.
1	DRUM GEAR GUARD	B1066	1	B1066	1
2	DRUM ASSEMBLY	B1040	1	B2365	1
2a	DRUM	B2350	1	B2364	1
2b	SLEEVE BEARING	A3326	2	A3326	2
3	TIE DOWN	A1013	1	A1013	1
4	HEX NUT .250-20NC SST	A3331	1	A3331	1
5	CARRIAGE BOLT .250-20NC X .500 SST	A3333	1	A3333	1
6	LOCK WASHER SPLK INT .375 X .692 X .035 SST	A3939	2	A3939	2
7	HEX JAM NUT .375-16NC SST	A3330	2	A3330	2
8	RETAINING RING EXT .625 SST	A4136	2	A4136	2
9	HANDLE SHAFT	A1141	1	A1144	1
10	RATCHET PIN	A1142	1	A1146	1
11	FLANGE BEARING .627ID X .877OD X .625	A1003	2	A1003	2
12	FRAME	C1030	1	C1032	1
13	GROOVE PIN TYPE A .187 X 2.00 ALYSTL	A4851	1	A4851	1
14	RATCHET PAWL	A1047	1	A1047	1
15	TORSION SPRING .690 X .080 SST	B1145	1	B1145	1
16	PINION	A1008	1	A1008	1
17	HANDLE ASSEMBLY	B5868	1	B5868	1
18	LOCK WASHER HELSPR .625 X 1.086 X .156 SST	A3327	1	A3327	1
19	HEX JAM NUT .625-11NC SST	A3329	1	A3329	1
20	CAPSCREW HEXHD .375-16NC ZNPL GR5	A3492	1	A3520	1
21	DRUM SPACER .625 X 11 GA X 3.235	A1143	1	A1145	1



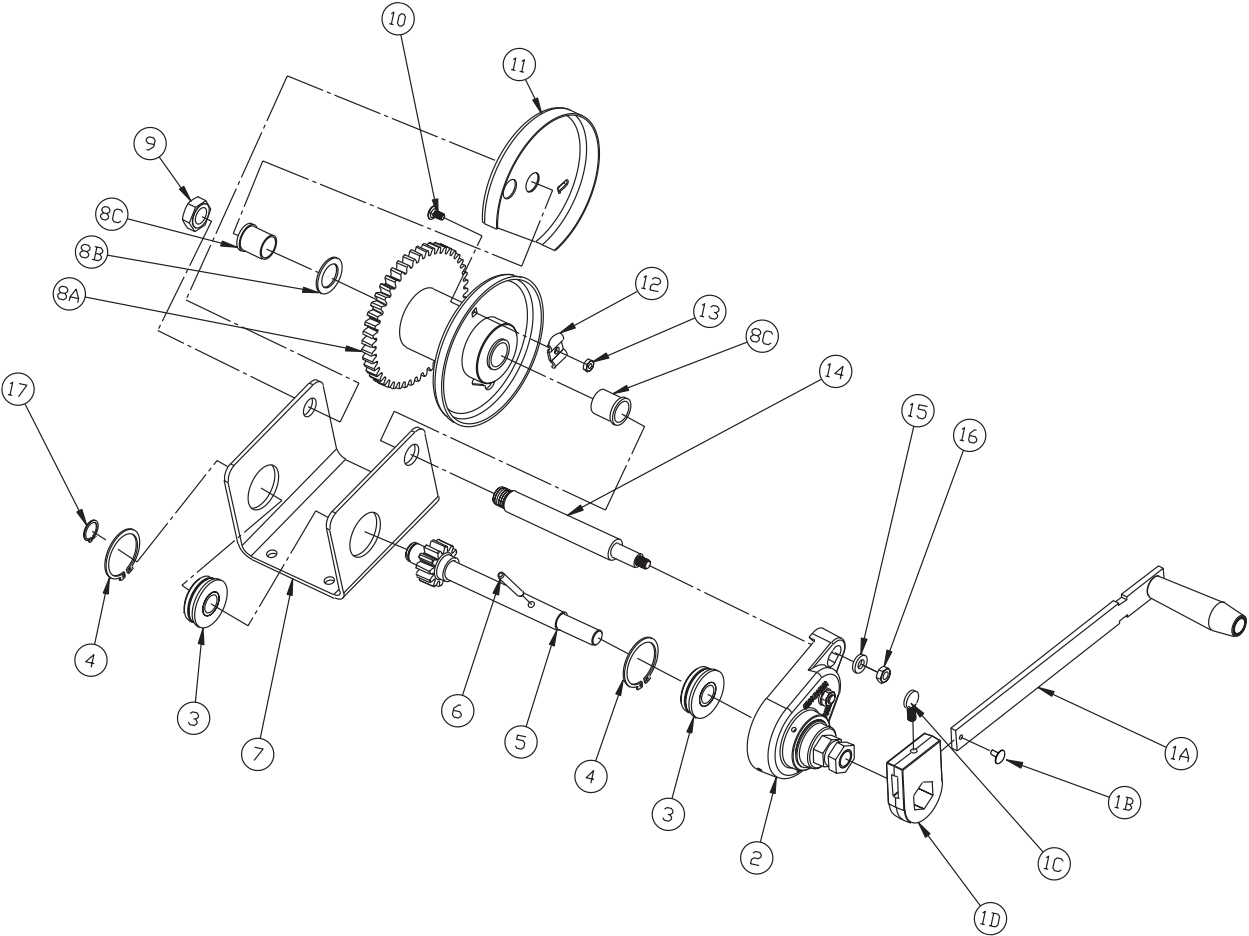
Spur Gear Hand Winch		Model M4022PB		Model M4032PB	
item	description	part number	qty.	part number	qty.
1	DRUM GEAR GUARD	B1066	1	B1066	1
2	DRUM ASSEMBLY	B1040	1	B2365	1
2a	DRUM	B2350	1	B2364	1
2b	SLEEVE BEARING	A3326	2	A3326	2
3	DRUM SPACER .625 X 11 GA X 3.235	A1143	1	A1145	1
4	HEX NUT .250-20NC SST	A3331	1	A3331	1
5	TIE DOWN	A1013	1	A1013	1
6	CARRIAGE BOLT .250-20NC X .500 SST	A3333	1	A3333	1
7 ¹	HEX NUT .375-16NC ZNPL GR2	A3113	1	A3576	1
8	RETAINING RING .625 SST	A4136	1	A4136	1
9	FLANGE BEARING .627 X .877 X .625	A1003	2	A1003	2
10	FRAME	C1030	1	C1032	1
11	PINION	A1008	1	A1008	1
12	GROOVE PIN TYPE A .187 X 1.375 ALYSTL	A4851	1	A4851	1
13	HANDLE SHAFT	SB3904	1	B2366	1
14	GROOVE PIN TYPE A .187 X 2.00 ALYSTL	A4532	1	A4532	1
15	DISC BRAKE ASSEMBLY	C3823	1	C3823	1
16	HANDLE MEDALLION ASSEMBLY	B4218	1	B4218	1
16a	THUMBSCREW .312-18NC X .750 SST	A8167	1	A8167	1
16b	MEDALLION	B4189	1	B4189	1
16c	DRIVE SCREW #10 X .250 SST	A11745	1	A11745	1
16d	HANDLE ASSEMBLY	B4187	1	B4187	1
17	SPACER .391 X .560 X 1.212	A1259	1	A1259	1
18	FLAT WASHER .375 X .750 X .125 SST	A1907	1	A1907	1
19	CAPSCREW HEXHD .375-16NC ZNPL GR5	A3519	1	A3528	1

¹Item 7 for M4032PB, part number A3576, is a Hex Jam Lock Nut .375-16NC ZNPL GRB.



INFORMATION ON THIS PAGE IS SUPPLIED BY MANUFACTURER & NOT VERIFIED BY ABC

Spur Gear Hand Winch		Model M4042PBSS	
item	description	part number	qty.
1	HANDLE MEDALLION ASSEMBLY	B4217	1
1a	HANDLE ASSEMBLY	B4201	1
1b	DRIVE SCREW #10 X .250 SST	A11745	1
1c	THUMBSCREW .312-18NC X .750 SST	A8167	1
1d	MEDALLION	B4199	1
2	BRAKE ASSEMBLY	C3825	1
3	BEARING HOUSING ASSEMBLY	A4420	2
4	RETAINING RING 1.875 SST	A4409	2
5	COUNTER SHAFT	B2415	1
6	GROOVE PIN TYPE A .250 X 2.000 SST	A4946	1
7	FRAME	B2409	1
8	DRUM ASSEMBLY	C2542	1
8a	DRUM	C2541	1
8b	MACHINERY BUSHING	A4418	1
8c	FLANGE BEARING	A1071	2
9	HEX JAM NUT .750-16UNF SST	A3886	1
10	CARRIAGE BOLT .250-20NC X .75 SST	A2846	1
11	DRUM GEAR GUARD	C2543	1
12	TIE DOWN	A5922	1
13	HEX NUT .250-20NC SST	A3331	1
14	DRUM SHAFT	B2410	1
15	FLAT WASHER .375 X .750 X .125 SST	A1907	1
16	HEX JAM NUT .375-16UNC SST	A3330	1
17	RETAINING RING .750 SST	A4408	1



This exploded view diagram illustrates the assembly of a mechanical system, likely a pump or motor component. The diagram includes the following parts and callouts:

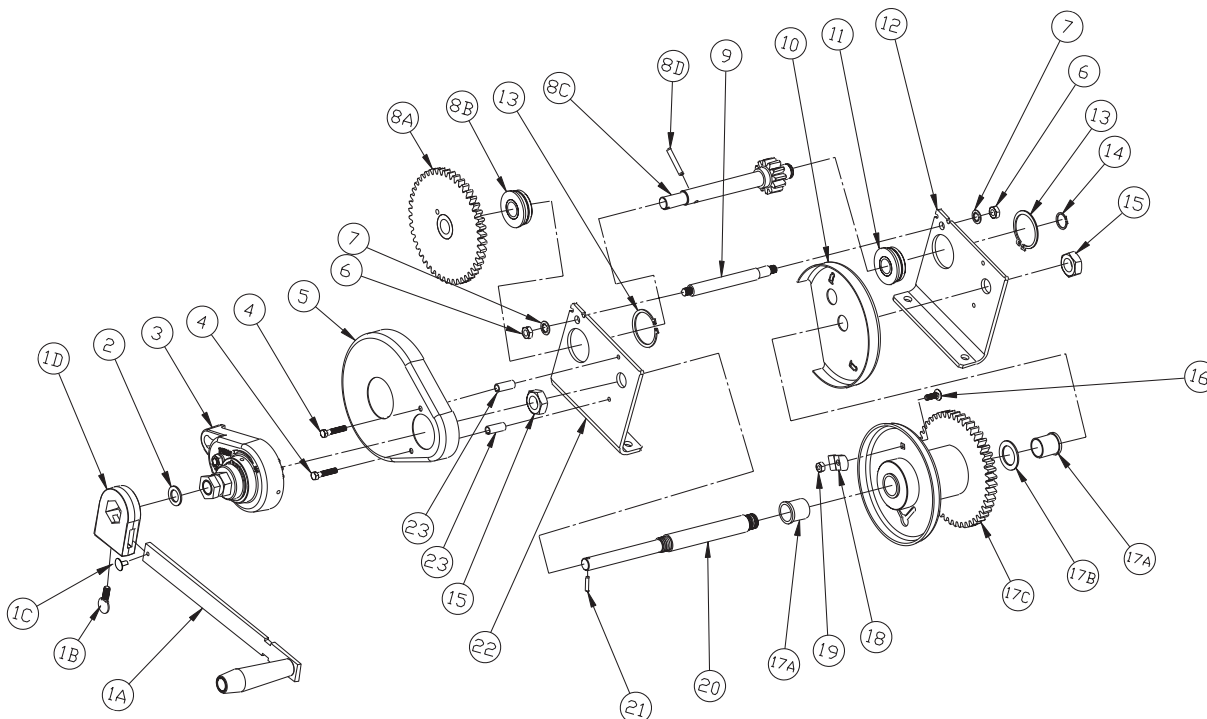
- 1:** A long shaft or drive arm with a gear at the end.
- 2:** Two small pins or spacers.
- 3:** A small bracket or support piece.
- 4:** A small pin or screw.
- 5:** A small circular component, possibly a washer or seal.
- 6A, 6B, 6C, 6D, 6E:** Various small pins, spacers, or fasteners.
- 7:** A small circular component.
- 8:** A small circular component.
- 9:** A small circular component.
- 10:** A small circular component.
- 11:** A small pin or screw.
- 12:** A small pin or screw.
- 13:** A small pin or screw.
- 14:** A small pin or screw.
- 15:** A small circular component.
- 16:** A small circular component.
- 17A, 17B, 17C:** A large gear or pulley with a central shaft.
- 18:** A small pin or screw.
- 19:** A small pin or screw.
- 20:** A small pin or screw.
- 21:** A small pin or screw.
- 22:** Two small pins or spacers.
- 23:** A small circular component.

The diagram shows the relative positions and assembly sequence of these components, with dashed lines indicating the alignment of the parts.

Spur Gear Hand Winch		Model M4312PB		Model M4312PBSS		Model M4412PB	
item	description	part number	qty.	part number	qty.	part number	qty.
1	HANDLE MEDALLION ASSEMBLY	B4218	1	B4217	1	B4218	1
1a	HANDLE ASSEMBLY	B4187	1	B4201	1	B4187	1
1b	THUMBSCREW .312-18NC X .750 SST	A8167	1	A8167	1	A8167	1
1c	DRIVE SCREW #10 X .250 SST	A11745	1	A11745	1	A11745	1
1d	MEDALLION	B4189	1	B4199	1	B4189	1
2	MACHINERY BUSHING .625 X 14 GA SST	A5059	1	A5059	1	A5059	1
3	BRAKE ASSEMBLY	C3824	1	C3826	1	C3824	1
4	CAPSCREW HEXHD NYLK	A1870	2	A1870	2	A1870	2
5	COUNTERSHAFT GEAR GUARD	B1021	1	B2475	1	B1021	1
6	HEX JAM NUT .375-16NC SST	A3330	2	A3330	2	A3330	2
7	LOCK WASHER SPLK INT SST	A3939	2	A3939	2	A3939	2
8	COUNTERSHAFT ASSEMBLY	SB3880	1	B2472	1	B2387	1
8a	GEAR	SB3876	1	B2471	1	SB3876	1
8b	BEARING	A1256	1	A4599	1	A1256	1
8c	COUNTER SHAFT	SB3879	1	B2469	1	B2386	1
8d ¹	SLOTTED SPRING PIN .218 X 1.500 STL	A4083	1	A4943	1	A4083	1
8e ²	SLOTTED SPRING PIN .125 X 1.500 STL	A4868	1	-	-	A4868	1
9	FRAME ROD	A1148	1	B2476	1	A1147	1
10	DRUM GEAR GUARD	B1067	1	C2543	1	B1067	1
11	RADIAL BALL BEARING	A1256	1	A4599	1	A1256	1
12	LEFT FRAME PLATE	C1034	1	C2564	1	C1034	1
13	RETAINING RING 1.750 SST	-	-	A3883	2	-	-
14	RETAINING RING .750 SST	A4408	1	A4408	1	A4408	1
15	HEX JAM NUT .750-16NF SST	A3886	2	A3886	2	A3886	2
16	CARRIAGE BOLT .250-20NC X .750 SST	A2846	1	A2846	1	A2846	1
17	DRUM ASSEMBLY	C1566	1	C2542	1	C1564	1
17a	FLANGE BEARING	A1071	2	A1071	2	A1071	2
17b	MACHINERY BUSHING	A3887	1	A4418	1	A3887	1
17c	DRUM	C2664	1	C2541	1	C1013	1
18	TIE DOWN	A1013	1	A5922	1	A1013	1
19	HEX NUT .250-20NC	A3331	1	A3331	1	A3331	1
20	DRUM SHAFT	SB3806	1	B2474	1	C1558	1
21	SLOTTED SPRING PIN .187 X .750 SST	A4282	1	A4282	1	A4282	1
22	RIGHT FRAME PLATE	C1033	1	C2562	1	C1033	1
23	SPACER .312 X .406 X 1.000	A2820	2	A4457	2	A2820	2

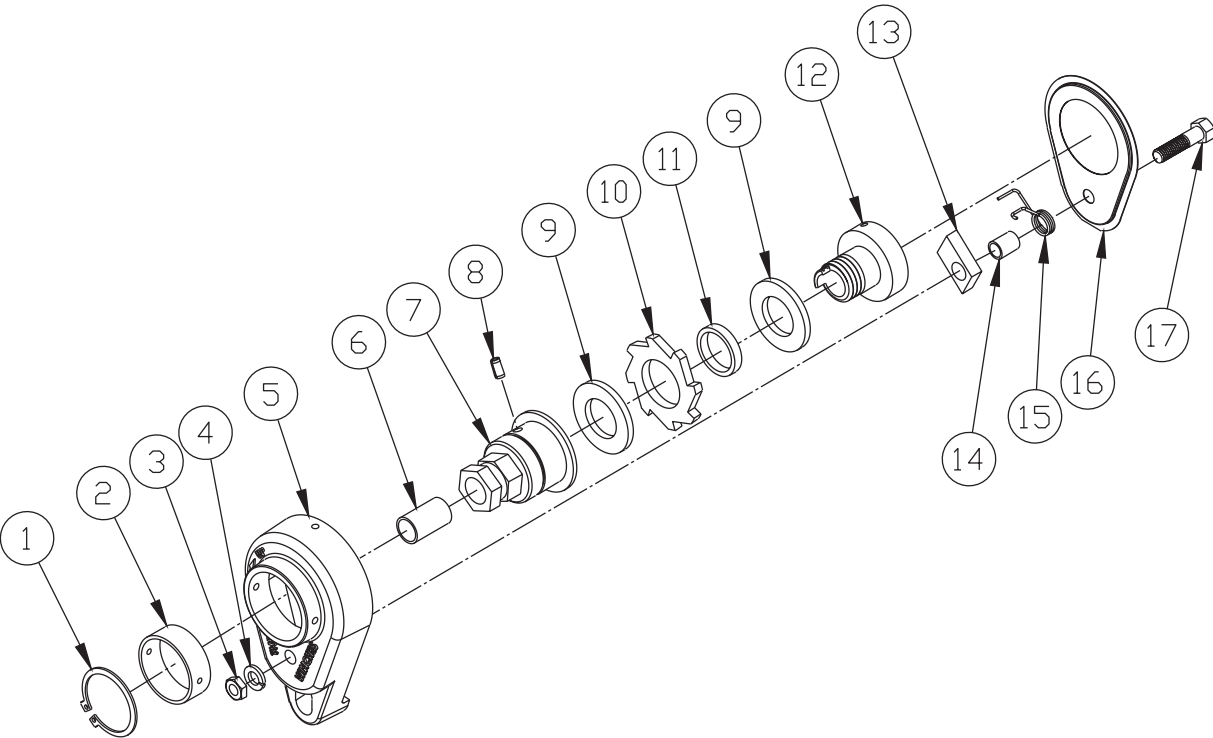
¹ Item 8d for M4312PBSS, part number A4943, is a Groove Pin Type A .250 x 1.500 SST HT.

² Item 8e is not shown in parts drawing.



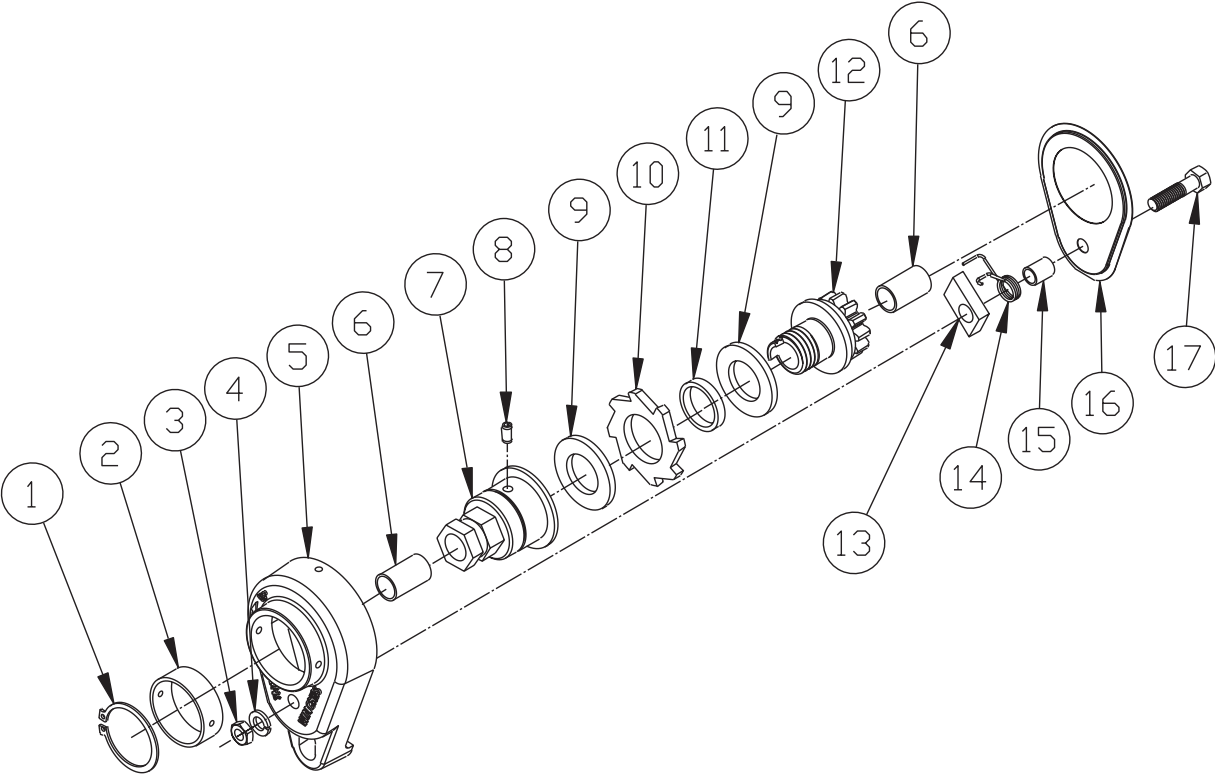
A8097G-0613

Disc Brake Assemblies		C3823		C3825	
item	description	part number	qty.	part number	qty.
1	RETAINING RING 1.750 SST	A3883	1	A3883	1
2	SLEEVE BEARING	SA3990	1	SA3990	1
3	HEX JAM NUT .375-16NC SST	A3330	1	A3330	1
4	LOCK WASHER HELSPR .375 X .683 X .094 SST	A3357	1	A3357	1
5	BRAKE HOUSING	C2807	1	C2547	1
6	SLEEVE BEARING	A3223	1	A3223	1
7	HEX DRIVE NUT	B4209	1	B4220	1
8	SLOTTED SPRING PIN .250 X .500 SST	A3275	1	A3275	1
9	FRICTION DISC	SA4569	2	SA4569	2
10	BRAKE RATCHET WHEEL	SA3992	1	A4600	1
11	SLEEVE BEARING	SA3993	1	SA3993	1
12	BRAKE BOLT	SB3903	1	B2413	1
13	RATCHET PAWL	A1103	1	A4416	1
14	SPACER .391 X .500 X .675	A1104	1	A4415	1
15	TORSION SPRING	A1842	1	A1842	1
16	BRAKE COVER	A1105	1	A4417	1
17	CAPSCREW HEXHD .375-16NC X 1.500 SST	A3884	1	A3884	1



INFORMATION ON THIS PAGE IS SUPPLIED BY MANUFACTURER & NOT VERIFIED BY ABC

Disc Brake Assemblies				C3824		C3826	
item	description	part number	qty.	part number	qty.	part number	qty.
1	RETAINING RING 1.750 SST	A3883	1	A3883	1	A3883	1
2	SLEEVE BEARING	SA3990	1	SA3990	1	SA3990	1
3	HEX JAM NUT .375-16NC SST	A3330	1	A3330	1	A3330	1
4	LOCK WASHER HELSPR .375 X .683 X .094 SST	A3357	1	A3357	1	A3357	1
5	BRAKE HOUSING	C2807	1	C2547	1	C2547	1
6	SLEEVE BEARING	A3223	2	A3223	2	A3223	2
7	HEX DRIVE NUT	B4209	1	B4220	1	B4220	1
8	SLOTTED SPRING PIN .250 X .500 SST	A3275	1	A3275	1	A3275	1
9	FRICTION DISC	SA4569	2	SA4569	2	SA4569	2
10	BRAKE RATCHET WHEEL	SA3992	1	A4600	1	A4600	1
11	SLEEVE BEARING	SA3993	1	SA3993	1	SA3993	1
12	BRAKE BOLT	SB3807	1	B2478	1	B2478	1
13	RATCHET PAWL	A1103	1	A4416	1	A4416	1
14	TORSION SPRING	A1842	1	A1842	1	A1842	1
15	SPACER .391 X .500 X .675	A1104	1	A4415	1	A4415	1
16	BRAKE COVER	A1105	1	A4417	1	A4417	1
17	CAPSCREW HEXHD .375-16NC X 1.500 SST	A3884	1	A3884	1	A3884	1





Thern, Incorporated
5712 Industrial Park Road
Winona, MN 55987

PHN 507-454-2996
FAX 507-454-5282

EMAIL: info@thern.com
www.thern.com

SAFETY ALERTS & BULLETINS

CONTENTS IN THIS SECTION

Helmets with face guards	page 116
Hopper - loading balls	page 117

**J&J Amusements, Inc.**

4897 Indian School Rd NE

Salem OR 97305

U.S.A

Phone: 1-503-304-8899

Website: www.jjamusements.comE-mail: info@jjamusements.com

Bulletin No: 16FACEGUARD

Release Date: 02-04-2016

Effective Date: 02-04-2016

Supersedes: N/A

Completion Date: See text

Page: 1 of 1

SAFETY ALERT

Manufacturer: J&J Amusements, Inc.

Affected Production Dates: All

Name: Batting Cage

Affected Serial Nos: All

Model: All

Abstract of Issue:

Batters MUST WEAR HELMETS WITH PROTECTIVE FACEGUARDS while using batting cage equipment.

Reason for Release:

Helmets not being worn or worn without faceguards. This notice is being sent to reinforce the importance of using BATTING HELMETS WITH PROTECTIVE FACEGUARDS at your facility. Those of you who do not currently have guards on your batting helmets should IMMEDIATELY ATTACH GUARDS ONTO YOUR EXISTING HELMETS. J&J Amusements considers the safety of our batting cage customers and batting cage service personnel as our number one priority. For years, ABC (now a division of J&J Amusements) has required (as an operational safety standard) the use of batting helmets with protective faceguards while using batting cage equipment. It is critical that all helmets have a protective faceguard attached to them!

Action to be Taken:

Installation of faceguards on batting cage helmets and requirement of batters to wear helmets in batting cages.



DANGER

HOPPER | BALL LOADING

1. Power must be turned off before picking up balls or loading hopper with balls.
2. When loading, employees should sound warning for batters to leave batting stalls during maintenance of equipment.
3. Batting helmets with face guards should be used at all times when maintaining equipment.
4. Always unplug power to I.H.S. unit when servicing.
5. Never put more than 400 baseballs or 300 softballs in main hopper at one time.
6. Never put more than 200 baseballs in secondary hopper at one time.
7. Please review batting range safety and operations standards located in your owners manual before using equipment.



Questions about this procedure? Give us a call at (800)854-3140 or (503)304-8899.

