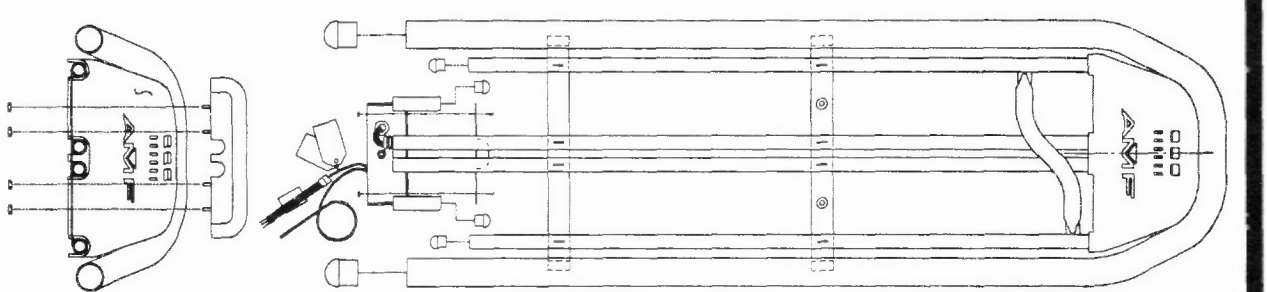
AMF

# C-90

# SMARTPATH BALL RETURN

## INSTALLATION GUIDE



Revised 11/96

Manual Part # 610-002-509

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Document/Part #: 610-002-509

Revision Date: 11/96

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**AMF BOWLING PRODUCTS, INC.**
**New Center Products Division**
**Mechanicsville, Virginia 23111**

# SAFETY PRECAUTIONS

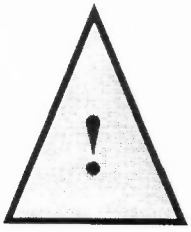
**WARNING!**
**Read This BEFORE Proceeding.**

**TO AVOID INJURY:**

**Read these safety precautions before attempting to install or modify any AMF Equipment.**

**Failure to follow these procedures may result in severe personal injury, fire, or permanent damage to property.**

- When you see this symbol



associated with instructions, a possible hazard or important note is indicated. Follow those instructions carefully and pay close attention to the important note.

- Before installing, removing, or replacing electronic equipment, be certain that the circuit breakers that supply power to the unit are turned OFF.
- Before applying power to a ball return, be sure that all cables have been connected properly - especially the power cables.
- Before operating a ball return, make sure that all GUARDS are in place.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# C-90 SMARTPATH BALL RETURN INSTALLATION GUIDE

## How To Use This Manual

This manual contains the information needed to install the Smartpath Ball Return and covers both new and conversion installations. If there are terms, concepts, or operations that are not clear to you, consult an experienced professional.

## Introduction

Before you begin installation, check your shipment against the packing list to insure that all ordered parts have been included. Report any damaged or missing items to AMF at 1-800-843-0682 between 8:00 a.m. and 5:00 p.m. Eastern Standard Time. You may leave a message on the voice mail system after 5:00 p.m. Our 24 hour fax line is 1-804-730-0923 and should be addressed to the attention of the New Center Products Technical Assistance.

Protect the lane surfaces before you begin installation of the Ball Return unit.

***Before installing the Smartpath Ball Return, be sure that all power to the unit is switched off at the main breaker box.***

***Verify that your power supply matches that needed by your Ball Return model. The main circuit breaker must not exceed 10 amps for 115 bolt operation, 5 amps for 230 volt operation. See "Connect the Wiring" later in this section.***


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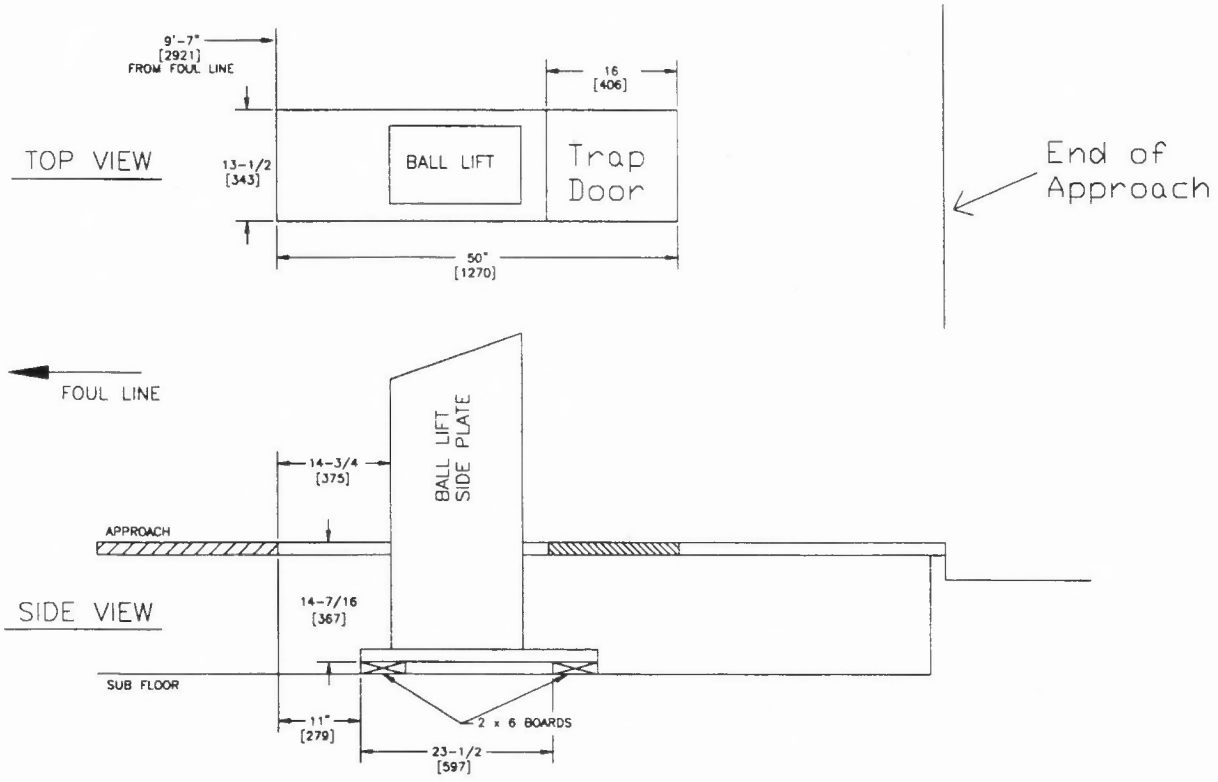
## Ball Lift Installation

The standard foundation for the Ball Lift mechanism is made of two 2 x 6 x 18" (51 x 154 x 457 mm) boards. Refer to Drawing #1. You may need to use different sized and/or additional materials to properly install the Ball Lift at your location.

The bottom edge of the ball lift should be 14 7/16" (367 mm) from the top of the approach floor. Shims are provided to level and raise the Ball Lift to the appropriate height.

❶ Cut a hole in the approach floor 50" x 13 1/2" (1270 x 343 mm) with a trap door as shown. The hole is to be centered with the underlane track.

❷ Place the first 2 x 6 (51 x 152 mm) board so that the edge closest to the foul line is 11" (279 mm) from the front edge of the floor cutout.




**DRAWING #1**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File: SMARTPAT.pm5
Revised: 25 Oct., 1996

❸ Place the second 2 x 6 (51 x 152 mm) board so that the edge closest to the foul line is 23.5" (597 mm) from the front edge of the first board.

❹ Using a leveling device, check the foundation setup to make sure that it is level. Use the 1/8" (3 mm) or the 1/4" (6 mm) shims from the Shim Pack (610-494-444) as needed to provide a level surface for the Ball Lift.

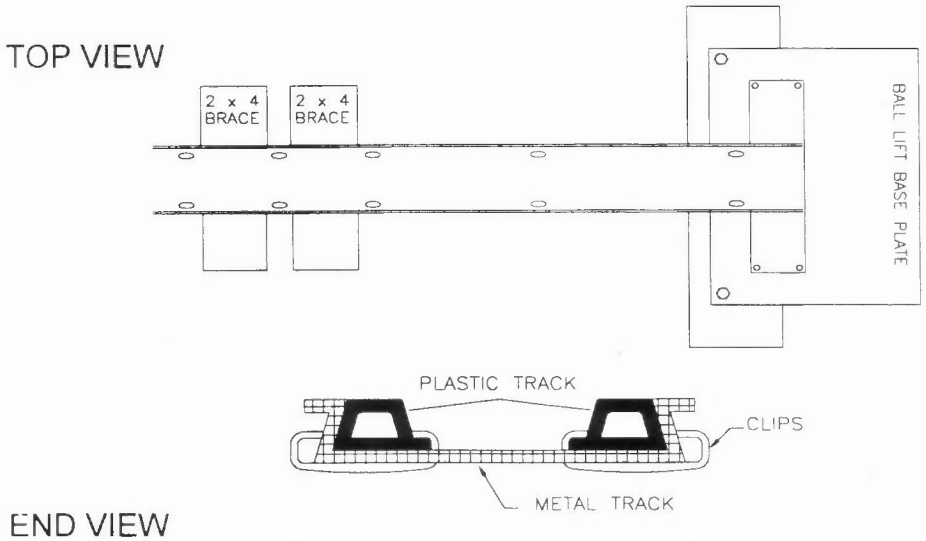
❺ Lower the Ball Lift mechanism into the opening. Position the Lift so that the edges of the side plates closest to the foul line are 14 3/4" (33 mm) from the front edge of the cutout. Make sure that the 2 x 6 (51 x 152 mm) boards are centered under the bolt holes in the base plate.

❻ Test the height of the Ball Lift mechanism. The base of the Lift should be 14 7/16" (367 mm) below the approach surface.

❼ Drill four holes through shims and 2 x 6 (51 x 152 mm) boards. Using 3/8" x 5" long Helilag screws (800-464-807) and four plain washers (945-867-242), secure the Ball Lift in place.

## UNDERLANE TRACK INSTALLATION (Modernization only)

Reinstall or replace the last section of underlane track so that there is a smooth transition into the Ball Lift.




**DRAWING #2**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❶ Lay the last metal track section in place but do not secure it. Lay the track over the four studs built into the Ball Lift base plate.

❷ Mark the proper length of the track section allowing for the Splice Bracket. Remove the Track and cut it to size.

❸ Position the Splice Bracket (000-021-165) at the joint of the metal track. Secure the bracket to the 2 x 4 (51 x 152 mm) braces using #12 x 1 1/4" hex head screws (821-142-202) with flat washers (000-026-865).

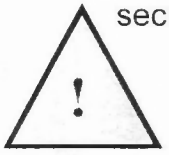
❹ Install the metal track using shims to obtain a smooth, level track joint.

❺ Attach the plastic track to the metal track using the track clamps (000-021-086). Use splice dowels (167-001-114) at each joint of plastic track to secure and align the track. Secure the dowels in place using an adhesive.

❻ Remove any excess plastic track using a sharp knife or a razor blade.

❼ Secure the metal track to the base plate using four 5/16"-18 locknuts (844-057-002), four 5/16" plain washers (948-761-112), and the four studs built into the base plate.

❽ Fill the last 6" (152 mm) of plastic track with splice dowels and secure the dowels in place using an adhesive.




*Now is a good time to inspect the plastic track for cracks, breaks, missing clips, or excessive wear. Replacement*

**TRACK INSTALLATION REPLACEMENT PARTS**

| DESCRIPTION | PART NO. |
|---|---|
| Steel Track - 8 ft. (2.4 meters) | 000-021-179 |
| Steel Track Plate Weld - 8 ft. (2.4 meters) | 000-021-185 |
| Plastic Track - 67 ft. (20.4 meters) | 167-003-122 |
| Spring Clip | 167-002-014 |
| Track Splice Dowel | 167-001-114 |
| Track Clamp | 000-021-086 |
| Screw, Hex Head #12 x 1 1/4" Type A | 821-142-202 |
| Insert Wedge | 167-002-016 |
| Shim Kit (1/8" & 1/4") | 610-494-444 |



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## CONNECT THE WIRING

***Before wiring the Smartpath Ball Return, be sure that all power to the unit is switched off at the main breaker box.***

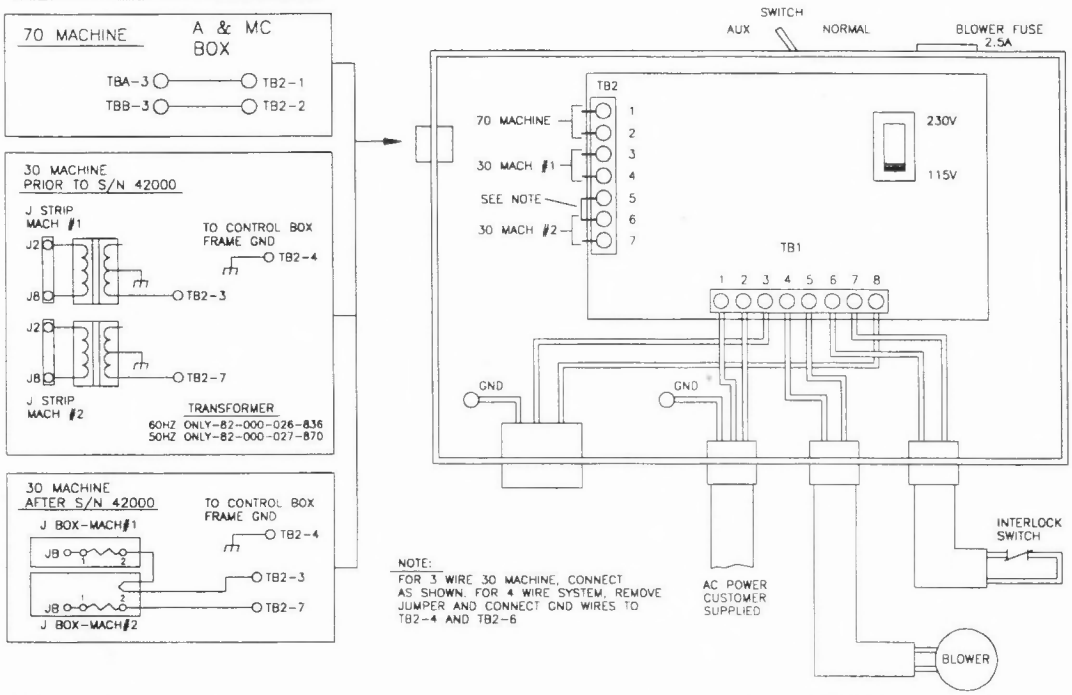
***Verify that your power supply matches that needed by your Ball Return model. The main circuit breaker must not exceed 10 amps for 115 volt operation, or 5 amps for 230 volt operation.***

***<u>Note:</u> The fan and tenth frame switches will be connected later, after the Ball Tray is installed.***

❶ Refer to Drawing #3. Attach the power supply conduit to the control box. Connect the wires to Terminal TB1, terminals 1 and 2, and ground the Control Box as shown in the wiring diagram.

❷ Locate the Ball Return Control wires and connect the wires to Terminal Block TB2, terminals one (1) through seven (7). Clamp the wires at the strain relief.

**DRAWING #3**





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## INSTALLING THE NEW BALL RETURN

** There are 3 hardware bags, one for each stage of the installation. The bag number is indicated on the packing list inside each bag.*

❶ See Drawing #4. Retrieve Hardware Bag #1. Install the stabilizing brackets on either side of the ball lift. Use the existing holes in the AMF power lift.

**HARDWARE BAG #1 MOUNTING STABILIZER BRACKETS (PART #612-500-066)**

| QTY | PART # | DESCRIPTION |
|---|---|---|
| 4 | 810-548-240 | LAG SCREW, 1/4 X 1-1/2 |
| 4 | 810-548-160 | LAG SCREW, 1/4 X 1 |
| 4 | 809-857-165 | HEX HD SCREW, 5/16-18 X 1 |
| 8 | 948-761-112 | FLAT WASHER, 5/16 |
| 4 | 951-156-002 | SPLIT LOCK WASHER, 5/16 |
| 4 | 834-557-002 | HEX NUT, 5/16-18 |
| 2 | 250-002-058 | BUMPER |
| 4 | 809-849-165 | HEX HD SCREW, 1/4-20 X 1 |
| 4 | 951-148-002 | SPLIT LOCK WASHER, 1/4 |
| 4 | 834-548-002 | HEX NUT, 1/4-20 |

***If mounting to other than AMF Ball Lift, before drilling holes to mount tongue brackets, make sure the hole locations will not affect the functioning of the lift.***


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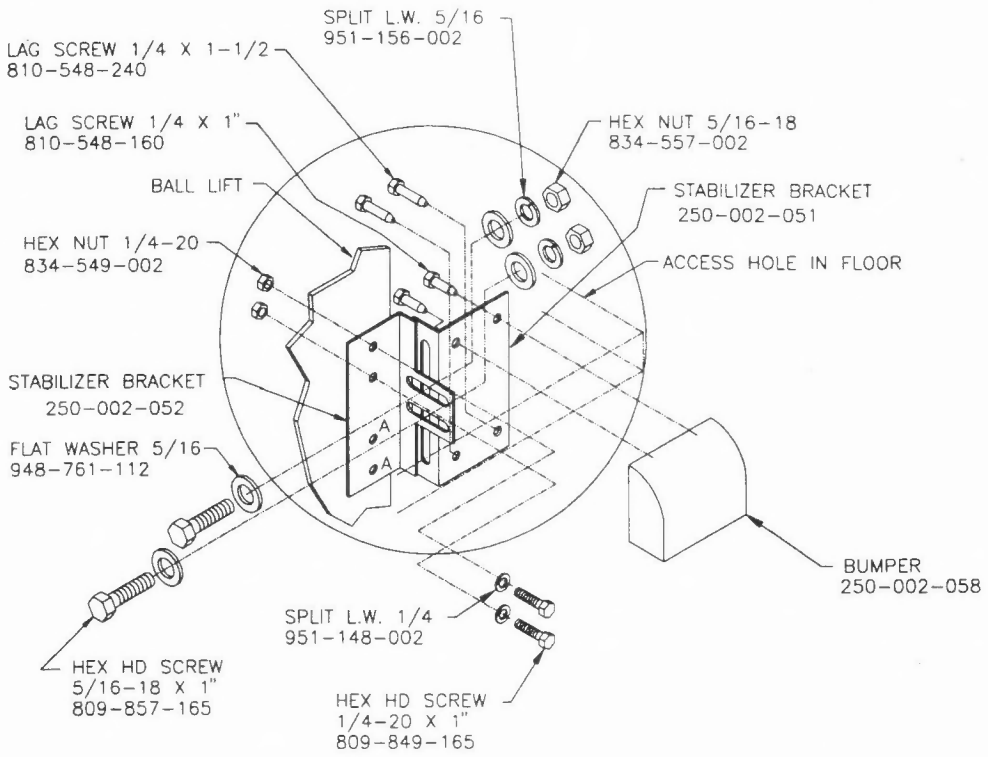
**DRAWING #4**




❷ Refer to Drawings #5 and #6. Open Hardware Bag #2. Measure from the edges of the power lift side plate to locate the mounting holes for the floor bracket and pivot bracket assembly. Center the hole patterns to the Ball Lift and mark the hole locations. Drill 9/32" (7 mm) starter holes and install the brackets as shown on the 3/8" (10 mm) lag screws. **Drill the second two holes in the pivot bracket assembly after it is fastened with the first two screws to avoid misalignment.**

**HARDWARE BAG #2 MOUNTING PIVOT BRACKET, FLOOR BRACKET, AND HOOD GUIDE**
**PART #612-500-110**

| QTY | PART # | DESCRIPTION |
|---|---|---|
| 4 | 810-564-240 | LAG SCREW, 3/8 X 1-1/2 |
| 4 | 948-767-132 | FLAT WASHER, 3/8 |
| 2 | 810-548-240 | LAG SCREW, 1/4 X 1-1/2 |
| 2 | 948-753-102 | FLAT WASHER, 1/4 |

❸ Refer to Drawing #6. Install access cover and adjust the floor bracket in its slots until the cover is vertical and the magnets are fully engaged.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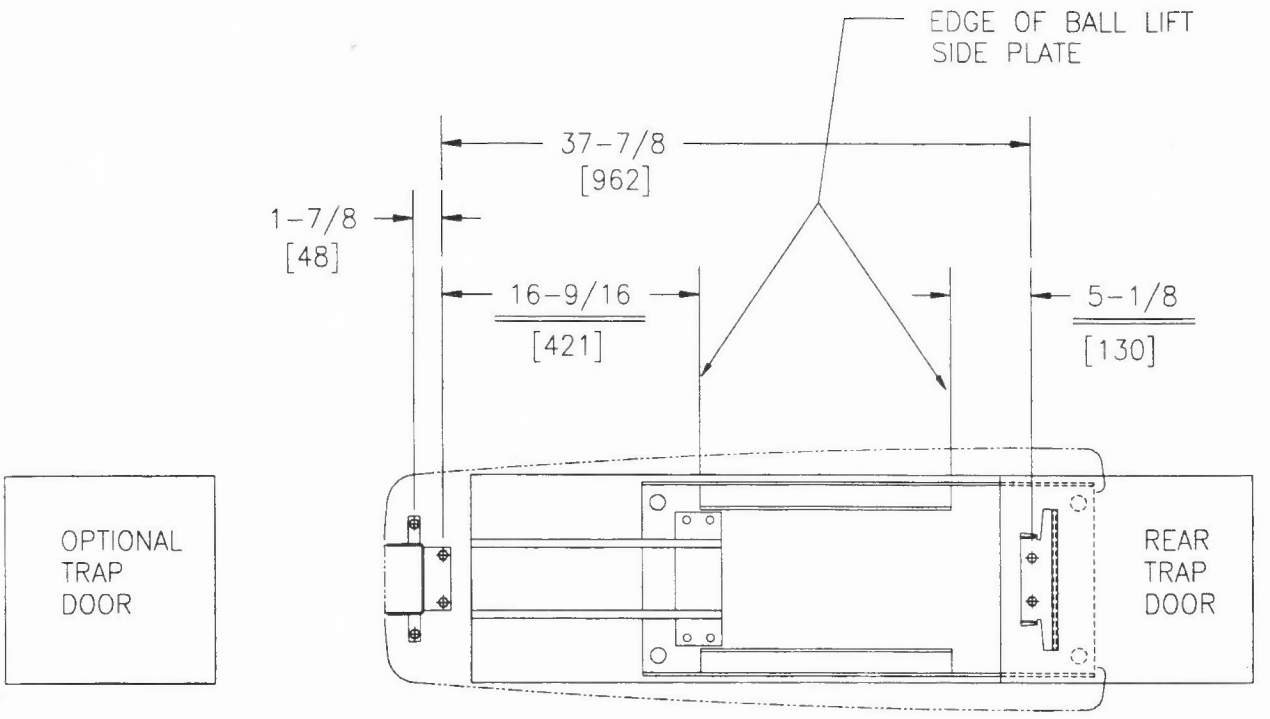
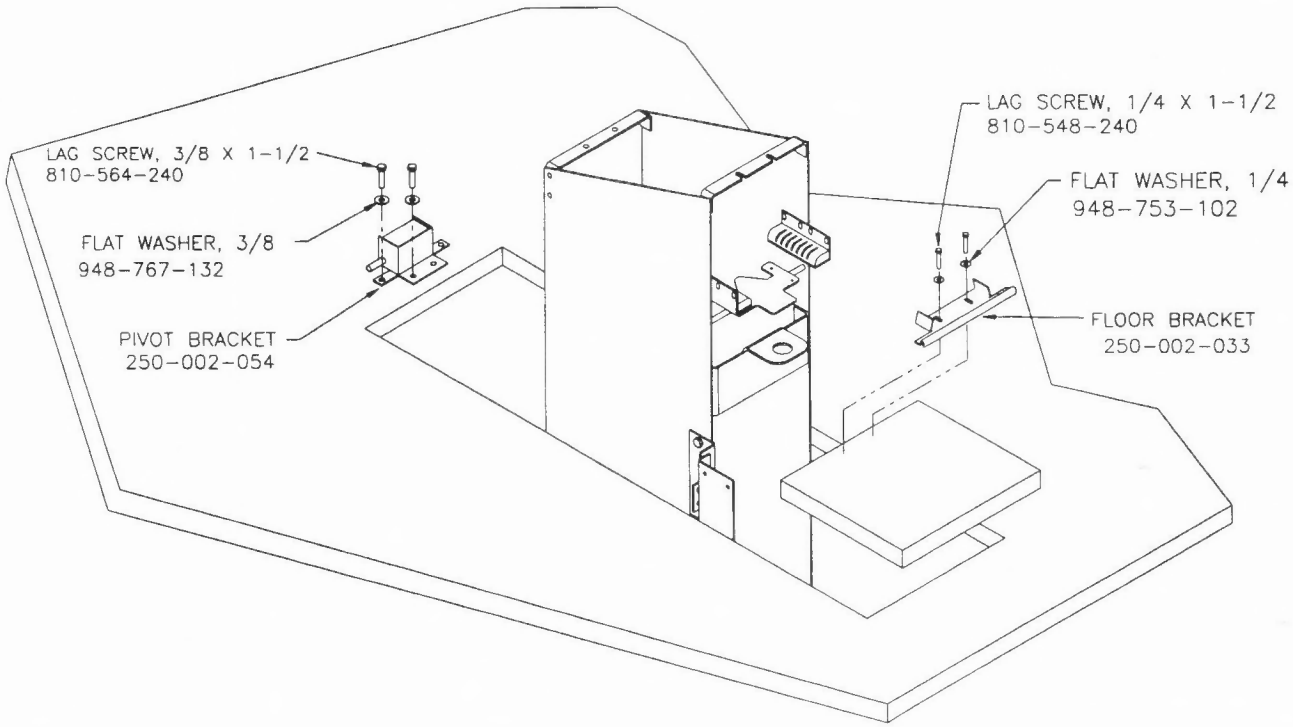



DIMENSIONS UNDERLINED ARE CRITICAL TO INSURE PROPER INSTALLATION

**DRAWING #5**




**DRAWING #6**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**HARDWARE BAG #3 MOUNTING BALL RACK**
**PART #612-500-111**

| QTY | PART # | DESCRIPTION |
|---|---|---|
| 4 | 250-001-925 | PLUG |
| 2 | 809-865-245 | HEX BOLT 3/8-16 X 1-1/2 |
| 2 | 951-164-002 | 3/8 LOCK WASHER |
| 4 | 948-767-132 | 3/8 FLAT WASHER |
| 2 | 810-564-240 | 3/8 LAG BOLT |
| 10 | 000-029-910 | C-WASHER 3/8 |
| 6 | 946-075-921 | C-WASHER 1/2 |
| 1 | 951-172-002 | 1/2" LOCK WASHER |
| 1 | 844-073-002 | HEX NUT 1/2-13 |

❹ Refer to Drawing #7. Attach leg to Ball Rack using hardware shown.

❺ Refer to Drawing #7. Attach Ball Rack to Ball Lift using hardware shown.

❻ Check tilt of Rack.
Release a ball on the center track with no initial speed a distance of 2 Bowling balls from the wave detector. It should pick up enough speed to fall into the side track.

❼ Add tilt using half inch C-washers at Ball Lift end. (See Drawing #7.)

❽ Reduce tilt using 3/8 inch C-washers between Ball Rack and leg. (See Drawing #7.)


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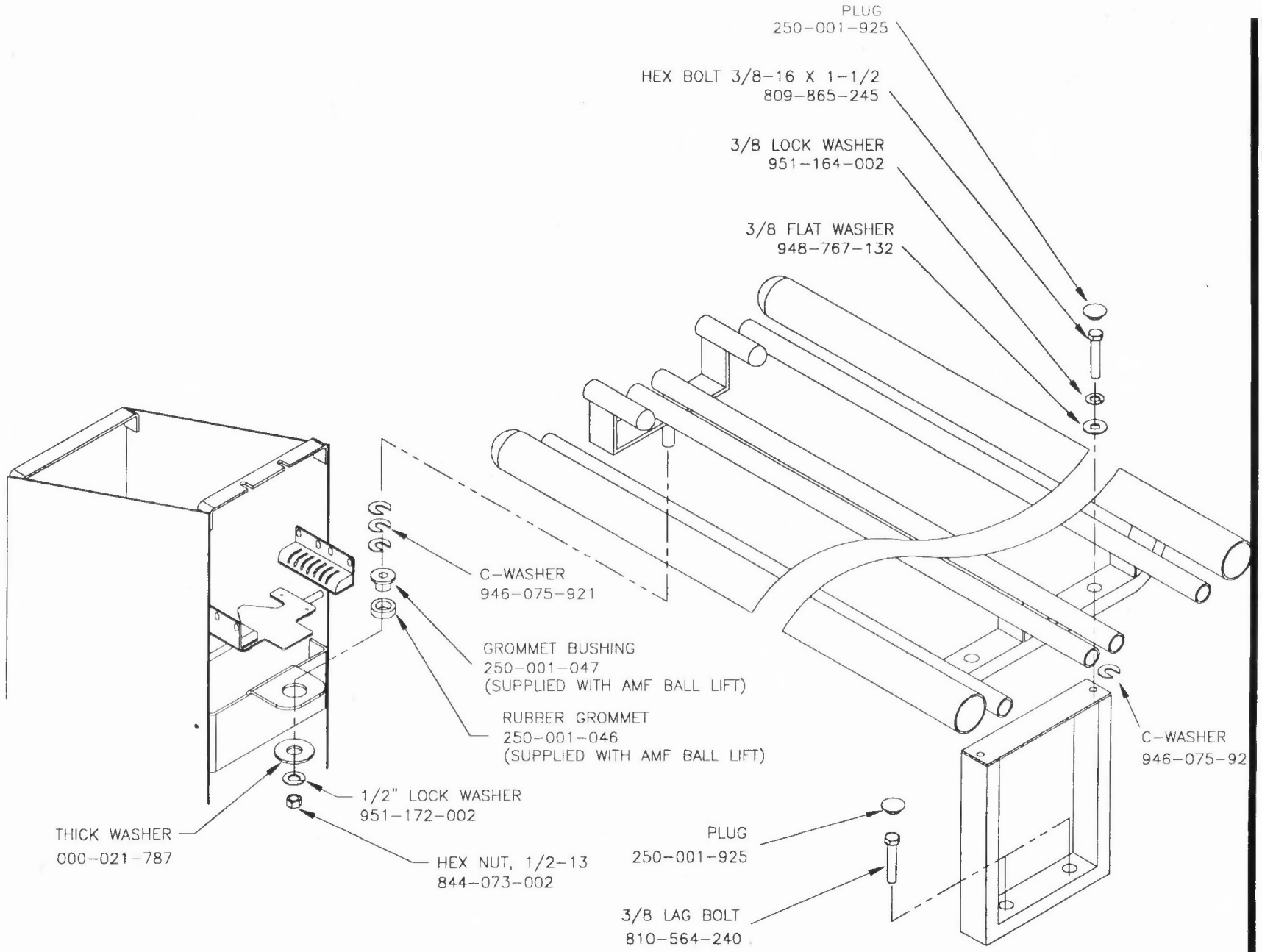


## DRAWING #7

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⑨ Retrieve the three wires for the Tenth Frame switches and the Pit Signal switch. Crimp the wires to the adapter as follows:

- Connect 2 leads from even machine to the blue and brown (or orange) wires.
- Connect 2 leads from the Pit signal to the black and red wires.
- Connect 2 leads from odd machine to the green and white wires.

⑩ Retrieve the 2 wires from the blower. Feed the wires through the center knockout of the control box and connect the leads to TB1, terminals 4 and 5, and GND.

*For Brunswick Ball Lifts, trace the blower cord, cut the wires and mark them so they can be easily found when new rack is installed.*

***Verify that the blower voltage on the tag and the blower itself match the site installation voltage.***


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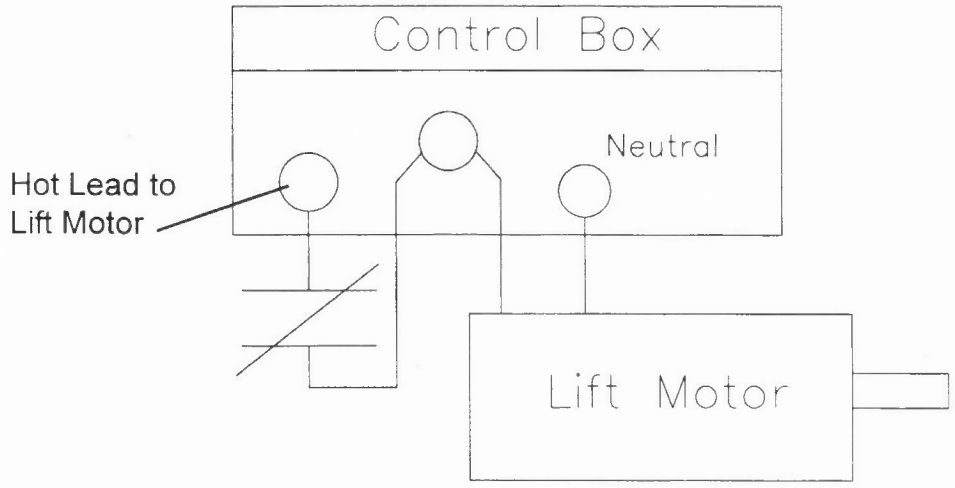
## Brunswick Rack Conversions

Installation of the return on the Brunswick Ball Lift requires a *Brunswick Retrofit Kit (*612-500-017) for each return. The retrofit kit includes all the parts needed, and includes instructions for assembling those parts and for wiring the fan, the mechanic call button, and the tenth frame switches. See Drawings #12, #13, and #14.

For installation of the stabilizer brackets, refer to Drawing #4. Mount bracket 250-002-051 to the floor as shown. Bolt bracket 250-002-052 to bracket 250-002-051 and use bracket 052 as a drill jig. Position so that the bolts will not interfere with ball travel.

In addition to those procedures, you need to wire the safety switch so that it opens the hot lead to the lift motor when the V-Wheel guard is tripped. The diagram below shows the wiring logic.




**DRAWING #8**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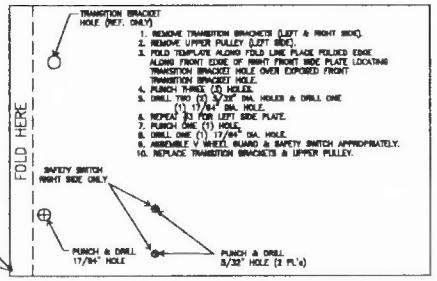
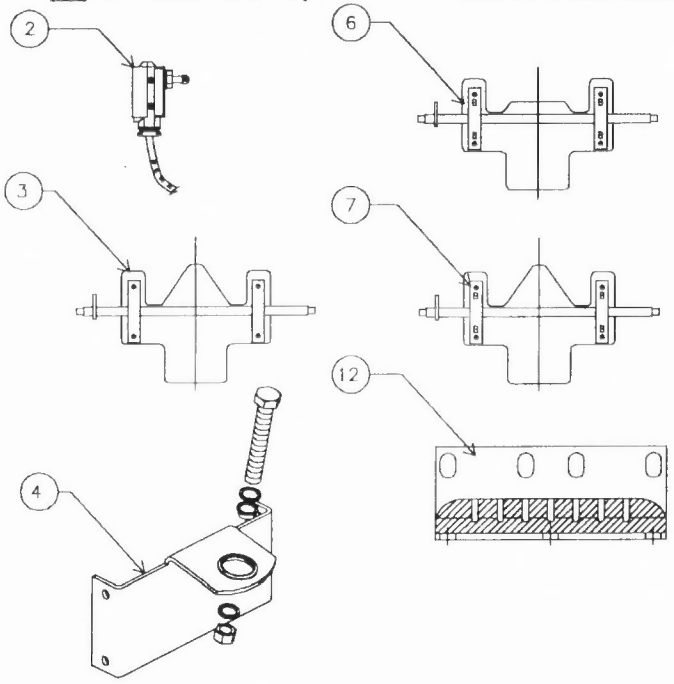
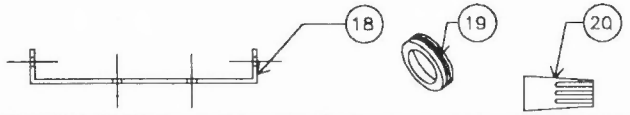
NOTE: ALL ITEMS EXCEPT #'s 1, 5 & 23 ARE TO BE
INDIVIDUALLY WRAPPED IN PACKAGING PAPER
PUT ITEM #21 IN A SEPARATE POLY BAG
PUT ALL HARDWARE IN A POLY BAG

NOTE: PUT IN PADDED SHIPPER ITEM #9.




NOTE: PUT IN PADDED SHIPPER ITEM #9.




| | | | |
|---|---|---|---|
| 22 | 1 | 250-001-223 | CONTROL BOX WIRING INSTRUCTIONS |
| 21 | 2 | 610-700-901 | POLY BAG 3-1/2 X 5 |
| 20 | 4 | 856-500-002 | #73B WIRE NUT (ORANGE) |
| 19 | 2 | 711-512-004 | GROMMET #230 |
| 18 | 1 | 250-001-023 | SPACER BRACKET |
| 17 | 4 | 000-022-869 | 3/8 PLAIN WASHER |
| 16 | 4 | 810-564-480 | 3/8 X 3" LONG LAG SCREWS |
| 15 | 4 | 948-761-112 | 11/32" WASHER |
| 14 | 4 | 839-057-002 | 5/16-18 LOCKNUT |
| 13 | 4 | 809-857-100 | HEX HEAD SCREW 5/16-18 X 1 |
| 12 | 2 | ~~250-001-435~~ | TRANSITION BRACKETS 250 001 119 |
| 11 | 6 | 840-065-002 | FLEX NUT TN 3/8-16 |
| 10 | 6 | 809-865-165 | HEX HEAD SCREW 3/8-16 X 1 |
| 9 | 1 | 610-700-963 | BAG-PAD .10 1/2 X 16 |
| 8 | 1 | 610-700-806 | BOX 13-3/4 X 13 X X 9-1/2 |
| 7 | 1 | 250-001-421 | V-WHEEL GUARD ASSEMBLY (BRUNSWICK) |
| 6 | 1 | 250-001-420 | TIRE GUARD ASSEMBLY (BRUNSWICK) |
| 5 | 1 | 250-001-076 | SIDE PLATE DRILL TEMPLATE |
| 4 | 1 | 250-001-075 | SUPPORT BRACE ASSEMBLY |
| 3 | 1 | 250-001-072 | V-WHEEL GUARD ASSEMBLY |
| 2 | 1 | 250-001-070 | INTERLOCK SWITCH ASSEMBLY |
| 1 | 1 | 234-001-246 | WARNING LABEL INRLK SW |



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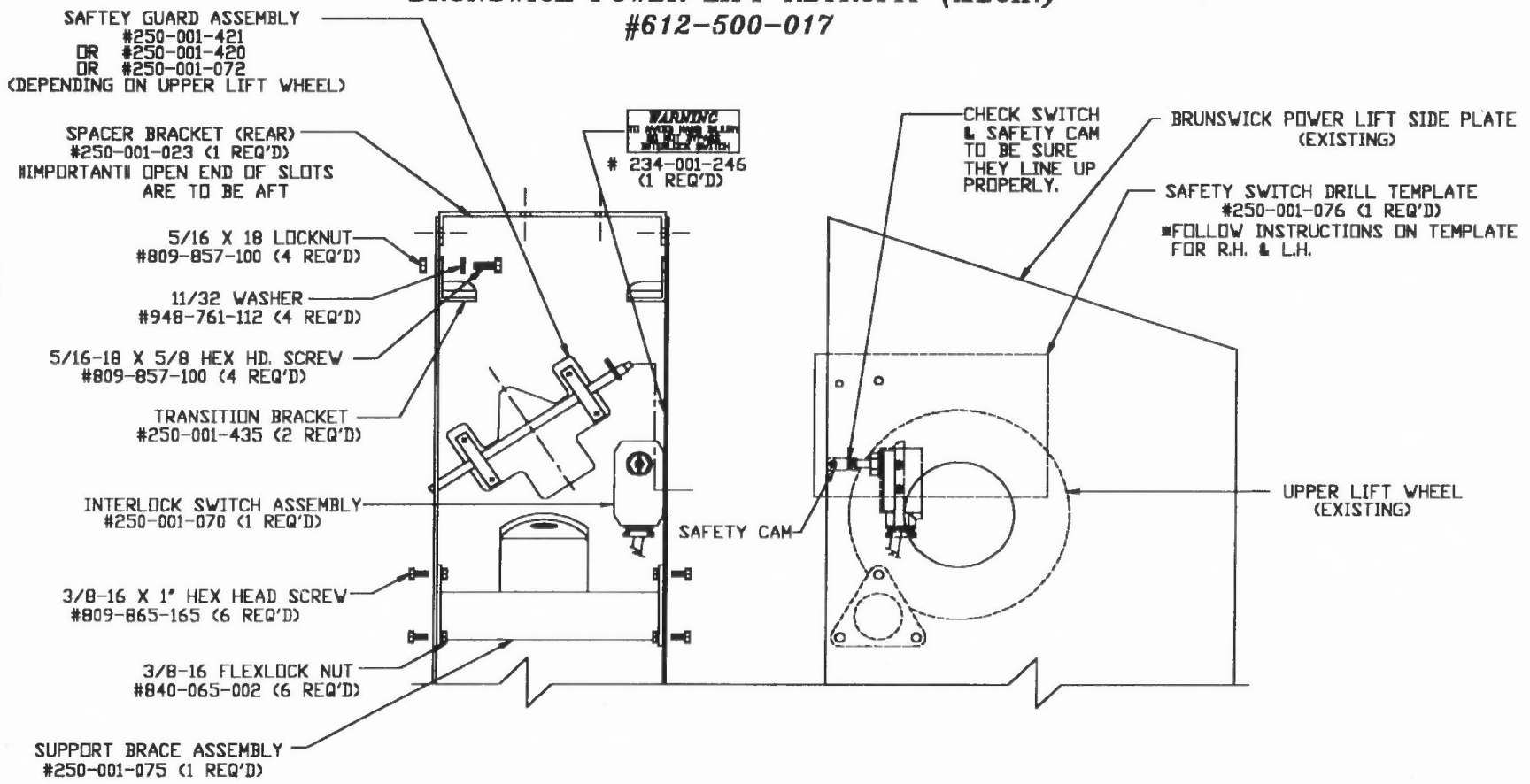
# BRUNSWICK POWER LIFT RETROFIT (MECH.)
## #612-500-017

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INSTRUCTIONS FOR AMF CONCEPT 90'S
BLOWER & SAFTEY SWITCH CONNECTION
TO BRUNSWICK TWINLINE OR RELATED CONTROL BOX

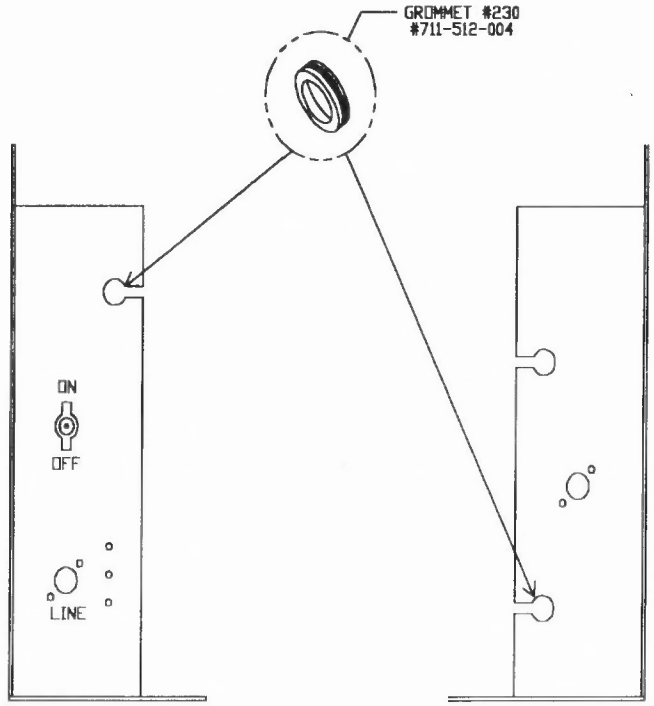
TO CONNECT AMF BLOWER (REF. DWG.#250-001-223)

1. SHUT OFF MAIN POWER
2. REMOVE CONTROL BOX COVER FROM CONTROL BOX.
3. PROVIDE "KNOCK OUT" FOR BLOWER SO CORD AND SAFTEY SWITCH SO CORD PER DIAGRAM.
4. SPLICE VIOLET WIRE CONNECTING TERMINAL "A" ON THE MOTOR CONNECTOR AND TERMINAL "H4" ON THE TRANSFORMER.
5. SPLICE WHITE WIRE CONNECTING TERMINAL "C" ON THE MOTOR CONNECTOR AND TERMINAL "H1" ON THE TRANSFORMER.
6. STRIP EACH OF THE TWO ENDS OF THE VIOLET AND WHITE WIRES APPROX. 1/2"
7. LOOSEN GROUND SCREW ENOUGH TO ADD THE AMF SO CORD BLOWER GROUND - FASTEN THE LOCKING SPADE TERMINAL OF THE AMF BLOWER SO CORD WITH THE GROUND TERMINALS FOR THE INCOMING POWER AND THE MOTOR.
8. JOIN THE TWO ENDS OF THE VIOLET WIRE PREVIOUSLY SPLICED, WITH THE AMF SO CORD BLACK WIRE USING THE AMF SUPPLIED ORANGE WIRE NUT.
9. JOIN THE TWO ENDS OF THE WHITE WIRE PREVIOUSLY SPLICED, WITH THE AMF SO CORD WHITE WIRE USING THE AMF SUPPLIED ORANGE WIRE NUT #856-500-002.

TO CONNECT SAFTEY SWITCH (REF. DWG.#250-001-223)

10. SPLICE BLACK WIRE CONNECTING TERMINAL "C" ON THE POWER SUPPLY CONNECTOR AND TERMINAL "1" ON THE POWER SWITCH.
11. STRIP EACH OF THE TWO ENDS OF THE BLACK WIRES APPROX. 1/2"
12. JOIN THE END OF THE BLACK WIRE PREVIOUSLY SPLICED AND CONNECTED TO THE POWER SUPPLY CONNECTOR WITH THE AMF SAFTEY SWITCH SO CORD BLACK WIRE USING THE AMF SUPPLIED ORANGE WIRE NUT.
13. JOIN THE OTHER END OF THE BLACK WIRE PREVIOUSLY SPLICED AND CONNECTED TO THE POWER SWITCH, WITH THE AMF SAFETY SWITCH SO CORD WHITE WIRE USING THE AMF SUPPLIED ORANGE ORANGE WIRE NUT #856-500-002.

## *BRUNSWICK POWER LIFT RETROFIT (ELEC.)*
## *#612-500-017*




SAFTEY SWITCH
(LEFT SIDE)

BLOWER
(RIGHT SIDE)



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## Testing and Setup

Perform each of the following tests to make sure the ball return works properly.

❶ Set the switch on top of the control box to "NORMAL." Turn on the power at the main circuit breaker. Check to see if the ball return starts.

*Note: The ball return will continue to run after the pinspotters are turned off to allow the balls in the underlane track and the ball exit to pass through the ball lift.*

❷ Check the operation of the safety switch by depressing the guard. If properly wired, the circuit to the lift motor will be broken and the motor will stop.

❸ With both pinspotters turned OFF, move the switch on top of the control box to the "AUX" position. The ball return motor should start and continue to run.

❹ Move the control box switch back to the "NORMAL" position. The ball return motor should stop without delay. This circuit bypass switch may be used in the event of control circuit or component failure.

❺ Return a few balls through the ball lift to make sure it works properly.


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## Optional Convenience Outlet

***As stated earlier, all electrical wiring can be dangerous and should be done only by qualified and experienced personnel.***

The pivot bracket at the rear of the ball return is designed to allow the mounting of a standard utility box.

❶ Remove the outlet cover plate (250-002-010) and the bracket beneath it.

❷ The rear of the box and bracket will accept a standard 1/2" conduit fitting. Wire AC power to the outlet and install a grounded duplex flush receptacle (electrical outlet, not provided).

❸ Install the cover plate on the receptacle with the screw provided with the receptacle.


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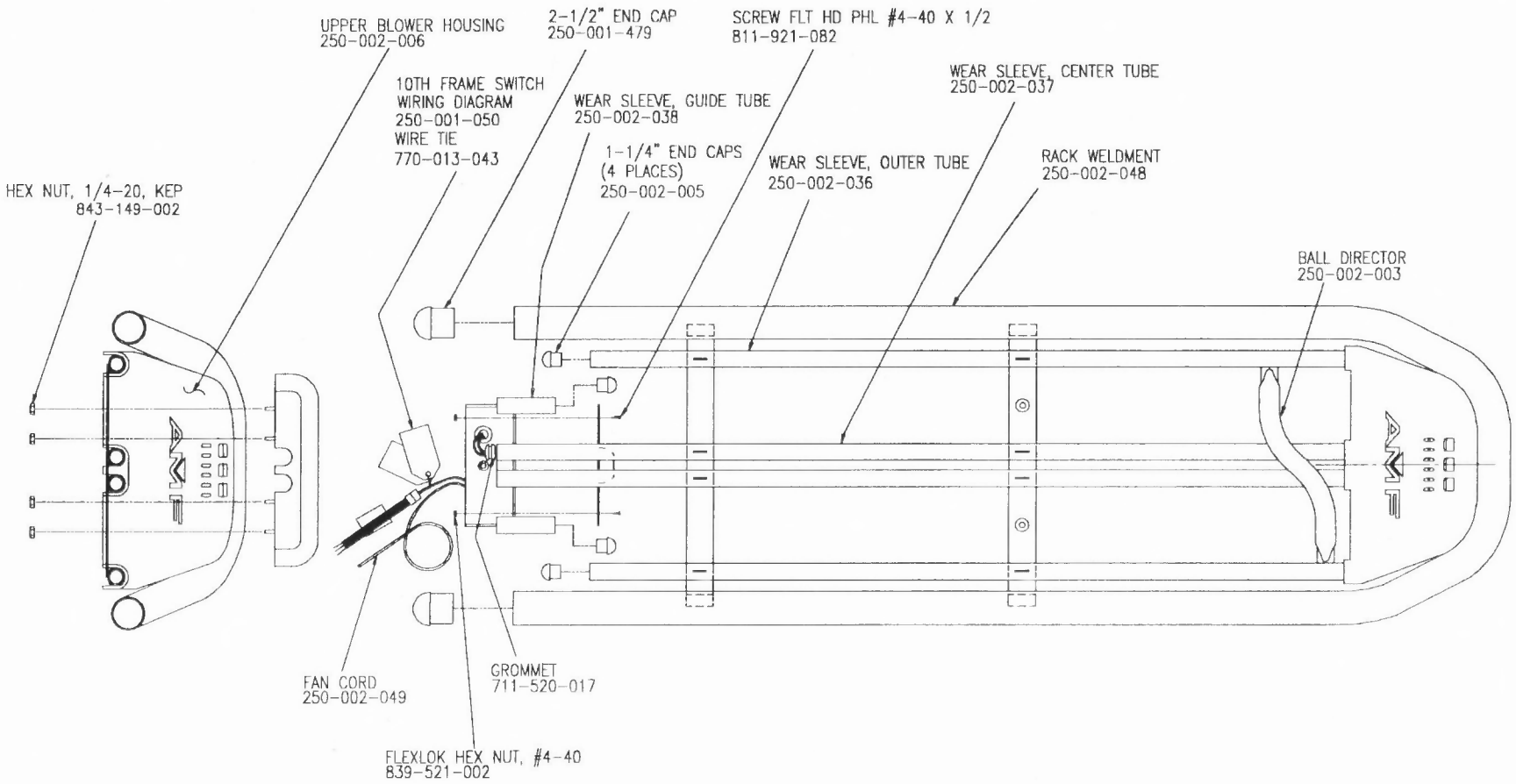


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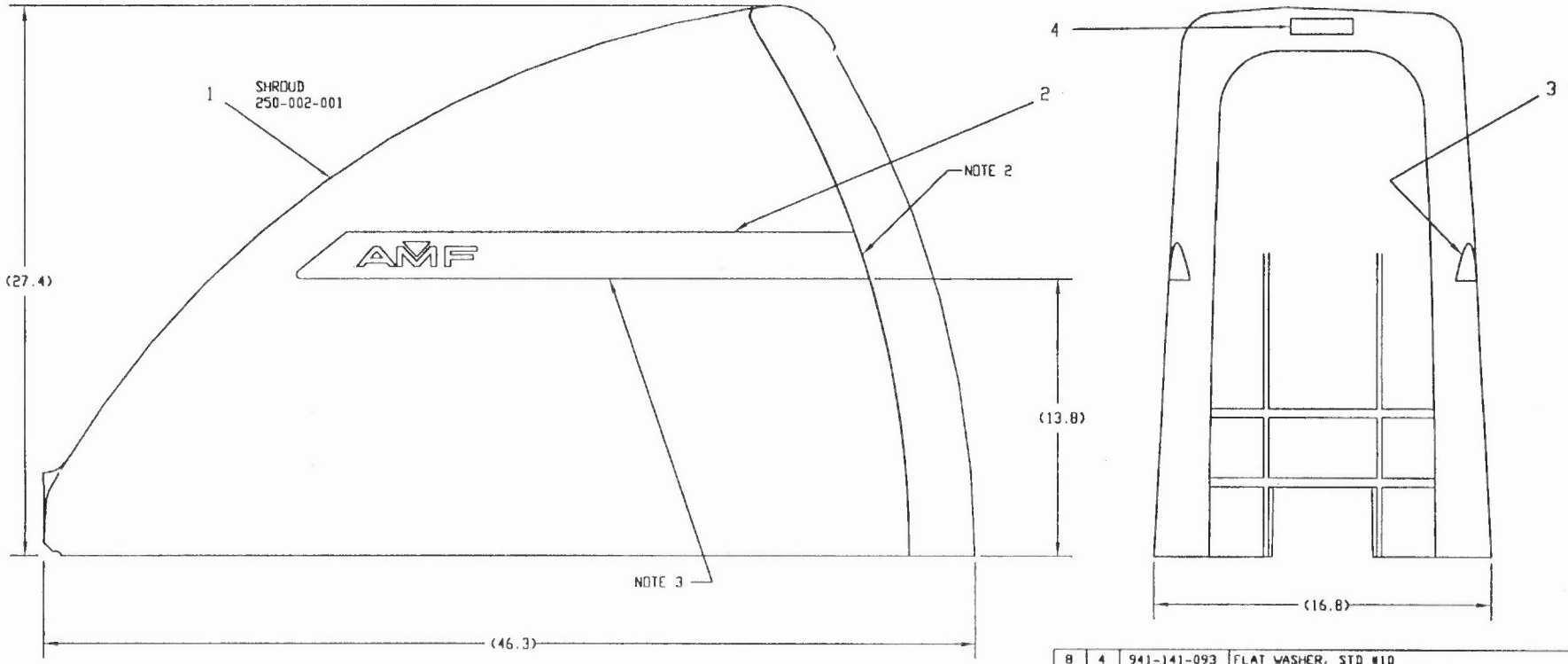


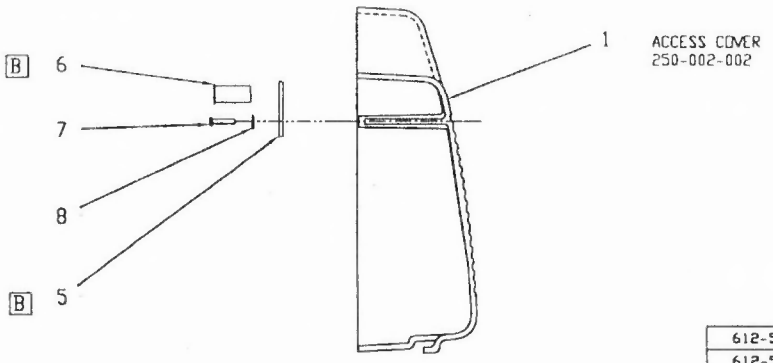


| ITEM | QTY | PART NUMBER | DESCRIPTION |
|---|---|---|---|
| 8 | 4 | 941-141-093 | FLAT WASHER, STD #10 |
| 7 | 4 | 818-239-082 | SCREW, #10-24 X 1/2" SEMS |
| 6 | 2 | 730-011-064 | MAGNETIC LATCH |
| 5 | 2 | 250-002-090 | MAGNETIC LATCH BRACKET |
| 4 | 1 | 250-001-074 | WARNING DECAL |
| 3 | 1 | 250-002-043 | L.H. STRIPE |
| 2 | 1 | 250-002-042 | R.H. STRIPE |
| | | SHROUD AND ACCESS COVER BOXED | |

PARTS LIST

GENERAL TOLERANCES

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

| xx DECIMALS | xxx DECIMALS | ANGLES |
|---|---|---|
| ± .015 | ± .005 | ± .5° |

REMOVE BURRS AND BREAK SHARP EDGES
INSIDE CORNERS
SURFACE ROUGHNESS ✓

INTERPRET DRAWING IN ACCORDANCE WITH ANSI Y14.5M-1982 AND MIL-STD-100

MATERIAL

| | | | |
|---|---|---|---|
| ENG APP | | | |
| CHECKED | | | |
| DRAWN BY | SDA | 11/16/93 | |

612-500-060
612-500-050
NEXT ASSY

DO NOT SCALE THIS DRAWING

AMF Bowling

SHROUD AND ACCESS COVER ASSEMBLY
C-90 BALL RETURN
SMART PATH

| SIZE | CLASS | DIV | NUMBER | REV |
|---|---|---|---|---|
| C | 82 | 250 | 002-045 | B |

SCALE: 1:4 | WEIGHT: | SHT