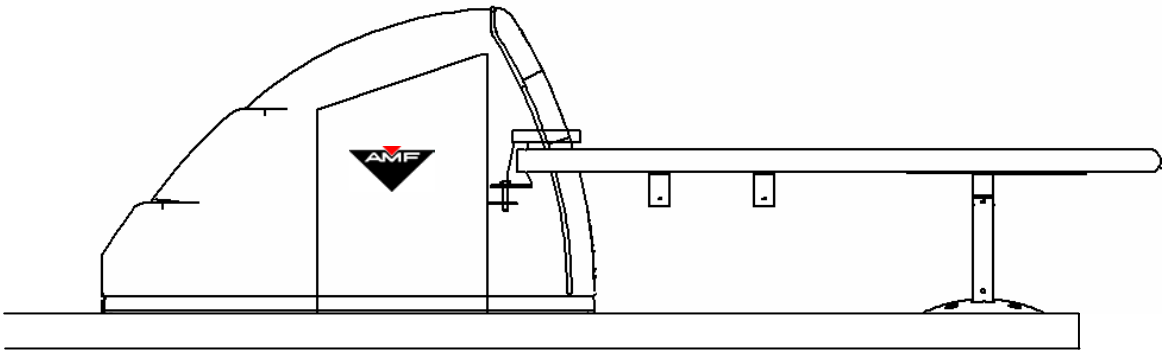
PROFILE BALL RETURN

Installation, Operation, Service, and Parts Manual



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AMF Bowling Products, Inc. reserves the right to revise and/or update this manual at any time without obligation to notify any person or entity of such revision. The document number, revision level, and date below indicate the edition of this manual.

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Summary of Changes

Change No.	ECRs

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HOW TO USE THIS GUIDE

This Guide contains information needed to properly install, operate, and maintain the ***PROfile*** Ball Return. If any terms, concepts, or operations contained in this Guide are not clear to you, consult an experienced professional or AMF Technical Support.

INTRODUCTION

Before you begin the installation, check your shipment against the packing list to ensure that all parts have been included. Report missing items to AMF at 1-800-342-5263 between the hours of 8:00 a.m. and 5:00 p.m. Eastern Time. After 5:00 p.m., you can leave a message on the voice mail system. The 24-hour fax line is 1-804-730-4390. Address all faxes to: AMF Products Technical Support.

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 an instruction,**

a possible hazard is indicated. Follow these instructions carefully.

- **Before installing, removing, or replacing electronic equipment, be certain that the supply power to the unit has been turned OFF at the main circuit breaker box.**
- **Verify that the power source matches that required by your Ball Return. The load rating is 10 amps for 115-volt units and 5 amps for 220-volt units. The circuit breaker should be sized according to applicable local and regional codes.**
- **Protect the approach and lane surfaces before you begin installation of the Ball Return unit.**
- **Before applying power to a Ball Return, be sure that all cables have been connected properly — especially the main power cables.**
- **Before operating a Ball Return, be sure that all GUARDS are in place.**

PACKING LISTS, COMPONENT SPECIFICATIONS, AND TOOLS

Now that you have received your new ***PROfile Ball Return***, the first thing that you should do is to verify that you have received all the correct parts. Refer to the appropriate list below.

If installing Part Number 612-050-001, you should receive the following parts:

Part Number	Description	Quantity
612-860-032	Installation, Operation, Service, and Parts Manual	1
250-001-001	Ball Lift	1
252-002-120	11-Ball Rack Assembly	1
252-001-008	15-Ball Rack Assembly (Optional)	1
252-002-100	PROfile Hood Assembly - Molded	1
252-002-105	Leg Assembly, Boxed	1
611-353-105	Ball Stop Underlane Return	1
610-494-444	Underlane Track Shim Assortment	1
612-860-033	Kit Installation Hardware Bag (with ball rack)	1

If installing the conversion kit, Part Number 612-050-002, you should receive the following parts:

Part Number	Description	Quantity
612-860-032	Installation, Operation, Service, and Parts Manual	1
252-002-200	11-Ball-Rack Assembly	1
252-001-008	15-Ball Rack Assembly (Optional)	1
252-002-100	PROfile Hood Assembly - Molded	1
252-002-105	Leg Assembly, Boxed	1
612-860-033	Kit Installation Hardware Bag (with ball rack)	1

Installation Hardware Bag (included with ball rack)

QTY	PART #	DESCRIPTION
4	810-564-240	3/8x1-1/2 Lag Screw
4	948-964-142	3/8x7/8x3/32 Washer
4	248-001-509	1-1/8 Button Plug, Black
2	826-057-162	5/16-18 X 1 Hex Head Screw
2	951-156-002	5/16 Split Lock Washer
6	964-075-921	1/2 C-Washer, Thick
1	252-001-052	Plate Power Assembly
1	252-001-053	Plate Cover Ball Return
4	826-933-081	#8-32x1/2 Screw, Self Tapping
2	843-127-002	#6-32 Nut, KEP, Washer
1	844-073-002	1/2-13 Nut, Stover, Lock

Component Specifications

The following table lists sizes and electrical specifications for the major components of the PROfile Ball Return.

COMPONENT	SPECIFICATIONS
Ball Lift	29 inches L x 12.38 inches W x 39.51 inches H (73.7 cm L x 31.45 cm W x 100.36 cm H)
Hood (at base)	External: 47.20 inches L x 17.50 inches W x 27.75 inches H (120 cm L x 44.5 cm W x 70.5 cm H)
Base	External: 46.99 inches L x 17.19 inches W x 3.25 inches H (119.35 cm L x 43.66 cm W x 8.26 cm H) Cut Out: 32.00 inches L x 13.50 inches W (81.28 cm L x 34.29 cm W)
Access Panel	13.01 inches W x 12.19 inches H x 2.74 inches D (33.05 cm W x 30.96 cm H x 6.99 cm D)
11-Ball Rack	66.63 inches L x 24 inches W x 15.86 inches H (with leg) (169.2cm L x 60.96 cm W x 40.28 cm H)
15-Ball Rack	81.15 inches L x 24inches W x 15.86 inches H (with leg) (206.12 cm L x 60.96 cm W x 40.28 cm H)
Leg Assembly	10.83 inches H x 1.76 inches W x 5 inches D (26.1 cm H x 4.5 cm W x 12. 7 cm D)
Lower Rack	45 inches L x 22 inches W x 3.15 inches H (114.3 cm L x 55.9 cm W x 8 cm H)

Installation Tools

The following is a list of tools needed for the installation of the PROfile Ball Return. Other tools may be required depending on whether you are installing the unit on a wood or synthetic approach.

Tape Measure
Hacksaw & Blades
Washable Marker
Circular Saw
Hammer Drill
Wire Strippers
Wire Cutters
Utility Knife
Crimpers
Level
Straight Edge / Framing Square
3/8-Inch Drive Ratchet
12-Inch, 3/8”-Drive Extension
7/16”, 1/2”, & 12mm Sockets
7/16”, 1/2”, 9/16”, & 3/4” Combination Wrenches
#2 Phillips Screwdriver
Small Flat Blade Screwdriver
3/16”, 7/32”, 9/32”, & 7/16” Drill Bits
5/16” Masonry Bit

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PROFILE BALL RETURN INSTALLATION

The standard foundation for the Ball Lift consists of two 2 x 6 x 18-inch boards over a concrete subfloor. While shims are provided to level and raise the Ball Lift to the required height, you may need to plane the boards and/or use additional materials to achieve the 14-7/16-inch (367 mm) required distance from the **bottom** surface of the Ball Lift base plate to the **top** surface of the approach.

Depending on the length of your approach, you may or may not have the ball rack overhanging the end of the approach. To determine the overhang at your center, perform the computation below using the numbers from your center.

IMPORTANT!

The position of the ball lift on the approach in the following calculation is based on a standard AMF underlane track installation that results in the end of the track being 125-7/16 inches from the lane side of the foul line. If possible, check this distance, and if different, offset the installation (including the cutout) as needed. Minor differences (no more than ± 1 inch) do NOT require any offset. If an installation other than the standard installation is desired, the underlane track can be lengthened or shortened as needed.

BALL RACK OVERHANG CALCULATION (See Figure 1)	11 Ball Rack (in inches)	15 Ball Rack (in inches)
1. Distance from Lane Side of Foul Line to End of Underlane track	125.4375	125.4375
2. Overall length of ball return (including Ball Rack and Hood)	103.8750	118.3750
3. **Subtotal A**	229.3125	243.8125
4. Distance from End of Track to back end of Hood (overlap of the two items above)	-21.8125	-21.8125
5. **Subtotal B**	207.5000	222.0000
6. Length of Approach (includes Foul Line, your approach may be different)	-192.000	-192.00
7. **OVERHANG**	15.500	30.000

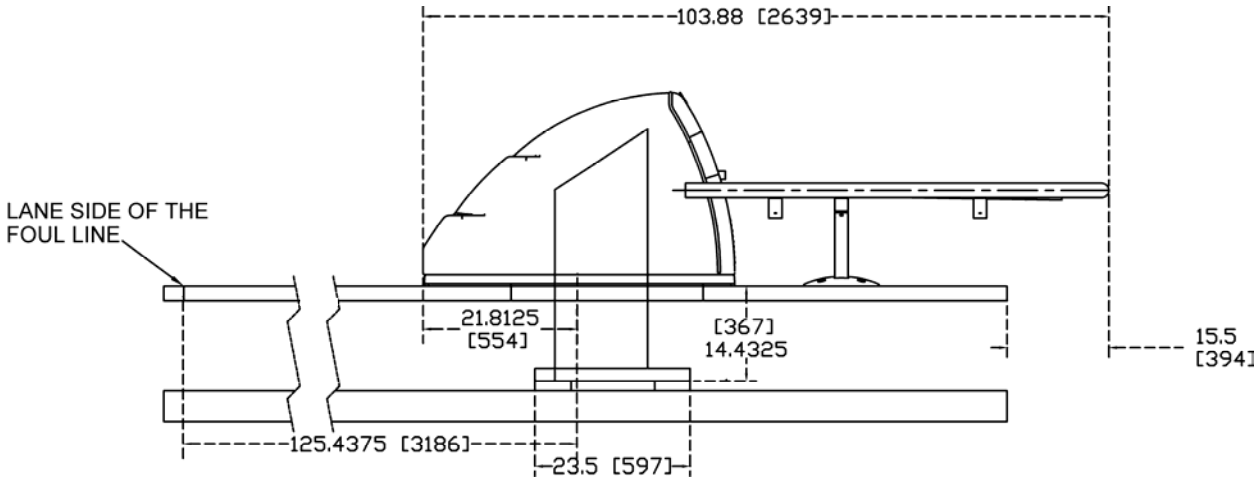


Figure 1, Standard Layout

APPROACH OPENING AND LIFT INSTALLATION

For new bowling centers, cut out the approach opening to meet the specifications given below. When replacing an existing installation, remove the old ball lift and fill in and/or cut out the approach opening, as necessary, to meet the specifications given below.

Cut out the opening and install the Ball Lift by completing the following steps and referring to Figure 2.

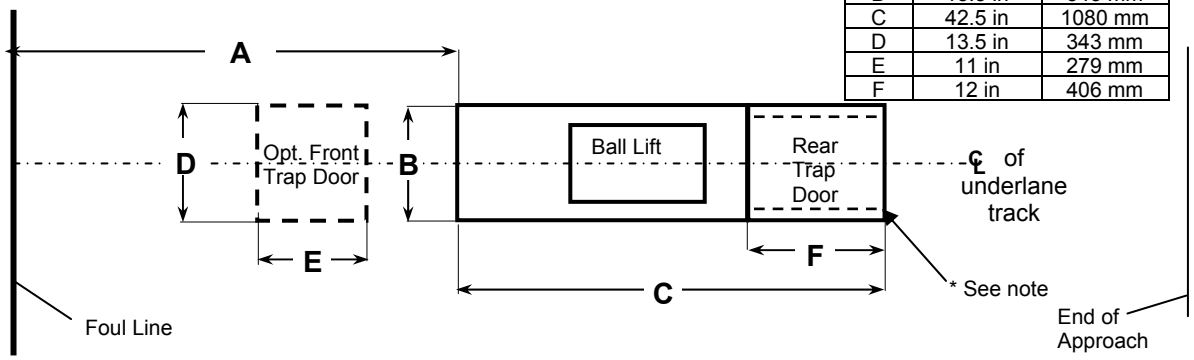
NOTE: The dimensions specified in the following directions are for a standard underlane ball return track installation and for **an approach length of 16 ft. (4877 mm)**, as shown in the calculation example on the previous page. Adjust the dimensions as necessary for the installation at your center. **If the location of the Ball Lift is shifted, it may be necessary to cut and splice the underlane ball return track to accomplish the installation.**

1. Mark the centerline of the underlane track on the approach.

2. Measure 113.13 inches (2873 mm) from the lane side of the foul line along the centerline you made in the previous step and use a framing square to draw a 13.5-inch (343 mm) line perpendicular to and centered on the line you made in step 1.

3. From the 13.5-inch line, draw a rectangle 42.5 inches L x 13.5 inches W (1080 mm x 343 mm) (C in Figure 2). Within this rectangle, measure 30.5 inches from the 13.5-inch line and draw another line to create the rear trap door (F in figure 2). We recommend you also create the front trap door for access (D and E in Figure 2), depending on where the Ball Stop is mounted. Locate the rear of this trap door about 12 inches from the cutout for the Ball Lift. Center the opening(s) on the center line you drew in step 1.

Cutout Specifications		
A	113.13 in	2873 mm
B	13.5 in	343 mm
C	42.5 in	1080 mm
D	13.5 in	343 mm
E	11 in	279 mm
F	12 in	406 mm



* Underlayment should be cut narrower in area of the rear trap door.

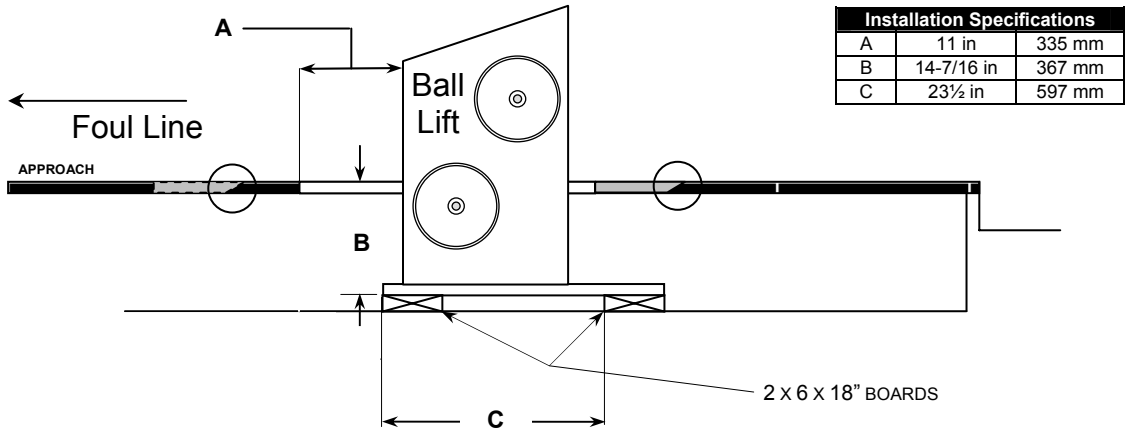
Figure 2, Approach Opening Layout – Top View

4. When installing the Ball Lift on wood approaches, for the front and rear trap door cutouts (E and F on Figure 2), make angled cuts to provide a “lip” for the pieces to rest upon the subfloor structure to keep them in place, as shown in Figure 3. For the Ball Lift cutout, make straight cuts.

5. If not installed earlier, attach the rail adapter plate (049-006-359), which is included with the underlane track, to the end of the underlane track using two 1/4 lock washers (951-148-002) and 1/4-20 x 1/2 hex screws (809-849-085) (See Figure 5). Tighten securely.

6. Place the first 2 x 6 board on the subfloor, perpendicular to the underlane track under the rail adapter plate. This is an approximate location.

7. Place the other 2 x 6 x 18-inch board on the subfloor parallel to the first board with its front edge 23.5 inches (597 mm) from the first board’s front edge (see Figure 3).



Installation Specifications		
A	11 in	335 mm
B	14-7/16 in	367 mm
C	23½ in	597 mm

Figure 3, Ball Lift Installation – Side View

8. All PROfile Ball Lift assemblies are shipped configured for 230-volt operation and, if necessary, must be reconfigured for 115-volt operation. To configure the Ball Lift motor for 115-volt operation, remove the motor’s electrical cover plate and reconnect the wiring for low voltage operation as shown in the wiring diagram on the motor’s frame. Reinstall the cover plate. Instructions for configuring the controller nd ball rack blower motor for 115 volts are provided later.

9. Lower the Ball Lift mechanism into the opening and onto the two 2 x 6’s. Position the Ball Lift in line with the underlane track so that the holes in the adapter plate on the end of the underlane track align with the four studs on the Ball Lift base plate.

10. Center the 2 x 6 boards under the bolt holes in the Ball Lift base plate and check the Ball Lift for level side to side and front to back. Use shims from the shim pack (610-494-444), as necessary.

11. Measure the distance from the underside of the Ball Lift base plate to the top surface of the approach. This distance **must be** 14-7/16 inches (367 mm). If necessary, add or remove shims, plane the 2 x 6 boards, etc. to achieve this measurement. Maintain the unit level side to side and front to back.

12. Drill four 7/16-inch (11-mm) clearance holes through the shims and 2 x 6 boards using the base plate mounting holes as a guide.

13. Drill four 5/16-inch (8-mm) holes in the concrete subfloor to a depth of at least 5/8-inch (16-mm) deeper than the estimated screwbolt embedment using the previously drilled clearance holes as a guide. Clean out loose material from the holes.

14. Anchor the Ball Lift to the subfloor using four 8-mm x 100-mm screwbolts (709-013-060), 7/8-inch o.d. flat washers (948-964-142), and 1½-inch o.d. flat washers (945-867-242). Apply moderate downward pressure to the screwbolts and **do NOT exceed 50 ft-lbs. (68 newton-meters) torque.** (See Figure 4.)

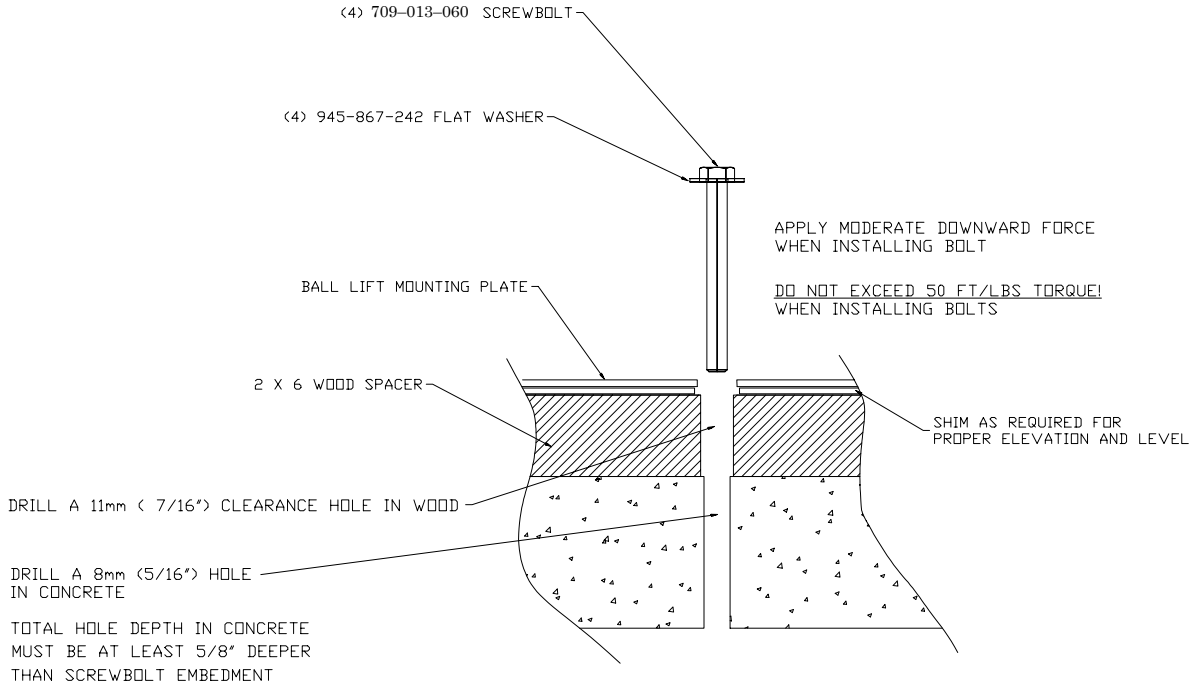


Figure 4, Ball Lift Mounting Requirements

15. Secure the adapter plate on the end of the underlane track to the Ball Lift base plate studs using four 11/32-inch i.d. flat washers (948-722-111) and 5/16-18 nylon insert lock nuts (839-057-002) as shown in Figure 5. Track alignment is critical for the smooth transition of the ball to the Lift. Adjust the track as necessary to ensure that the track is centered between the Ball Lift side plates. Shim the adapter plate as needed to obtain a smooth, level track joint.

16. If necessary, trim off any excess plastic track using a utility knife.

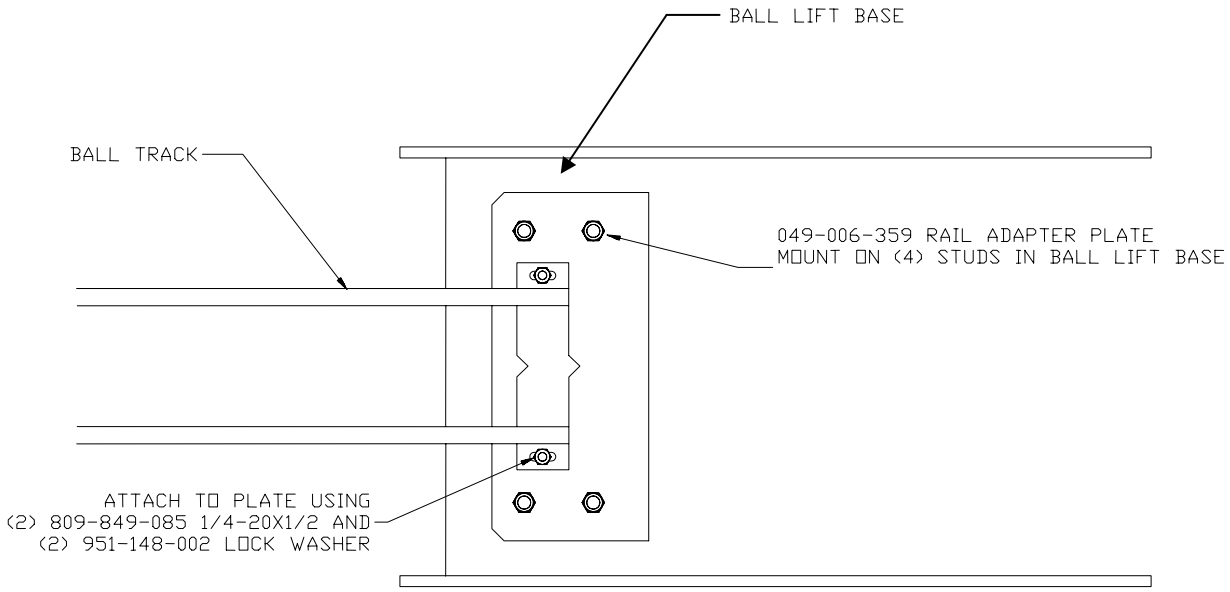


Figure 5, Track to Lift Connection

INSTALLING THE BALL STOP

The ball stop allows the ball to move down the track to the Ball Lift, but prevents the ball from moving backwards past the ball stop should the ball fail to be handled properly by the Ball Lift.

1. Assemble the ball stop as shown in Figure 6. Place the tube through the hole in the plastic stop and then position the stop between the ears of the metal bracket. Secure the plastic stop using the 5/16-18 x 2¼-inch bolt (809-857-365) and lock nut (844-057-002). The longest side of the plastic stop must be placed against the metal bracket and should hang down as shown in Figure 6.

2. Mount the Ball Stop to the first leveling strip forward of the Ball Lift as follows:

a) Center the plastic stop over the ball track with the centerline of the 2¼-inch bolt exactly 10 inches (25.4 cm) above the track's mounting plate.

b) Mark the leveling strip through the holes in the ball stop bracket, and drill two 7/32-inch pilot holes for mounting the Ball Stop at the marks on the leveling strip.

c) Mount the Ball Stop to the leveling strip using 5/16 x 1½-inch lag screws (810-556-240) and flat washers (948-761-112).

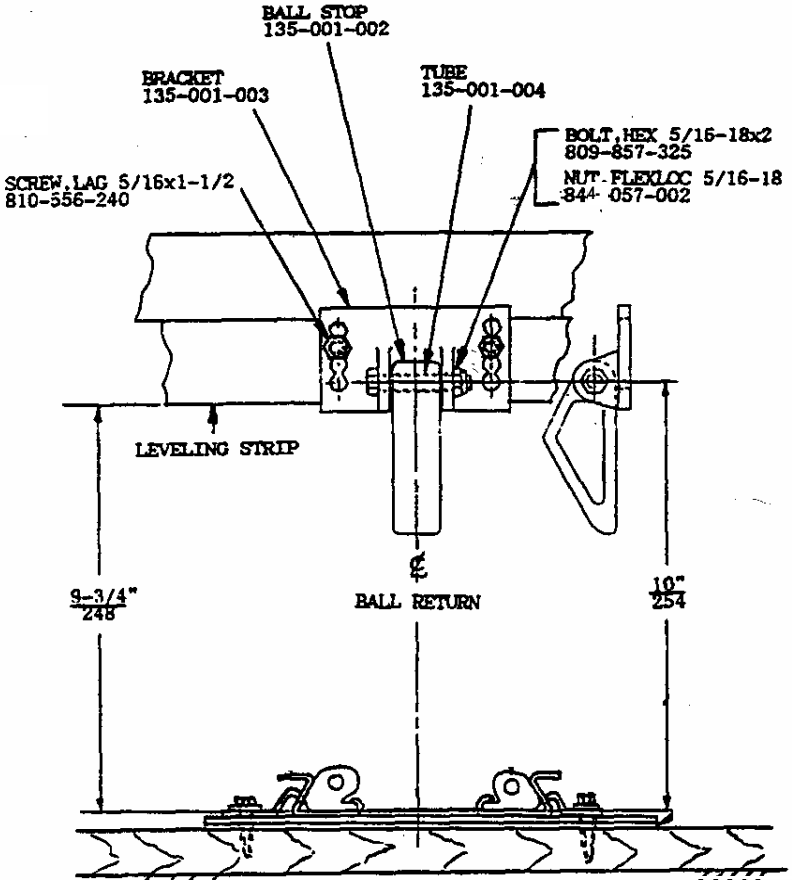


Figure 6, Ball Stop Installation

INSTALLING THE PROFILE HOOD AND BALL RACK ASSEMBLIES

The PROfile Hood Assembly (252-002-100) is a made up of a base, a hood, a mounting bracket, and an access panel, as shown in Figure 7.

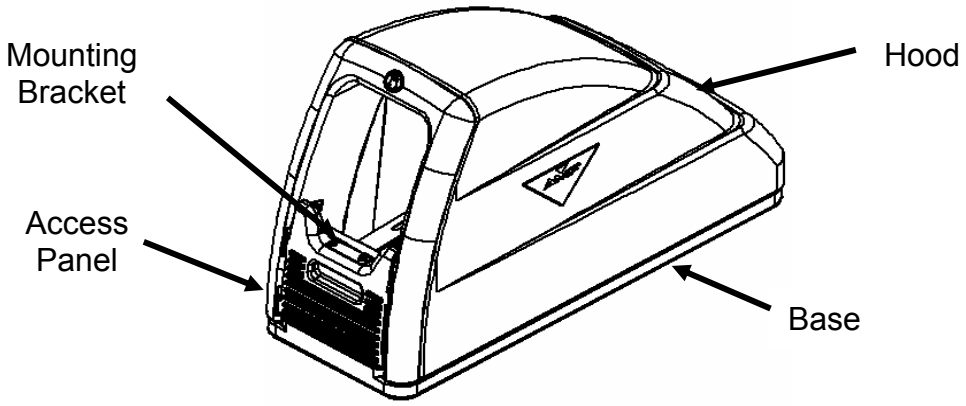


Figure 7, PROfile Hood Assembly

NOTE: The components come assembled and must be separated for installation. Before separating the components, mark the foul-line end of the base. DO NOT remove the mounting bracket from the access panel.

The ball rack assembly is made up of an upper ball rack and pedestal leg, and an optional lower rack. The upper ball rack can hold 11 balls. The ball rack is attached to the ball lift by the three-way bracket that connects the ball rack, ball lift, and PROfile hood.

NOTE: The ball rack and pedestal leg are shipped in separate boxes.

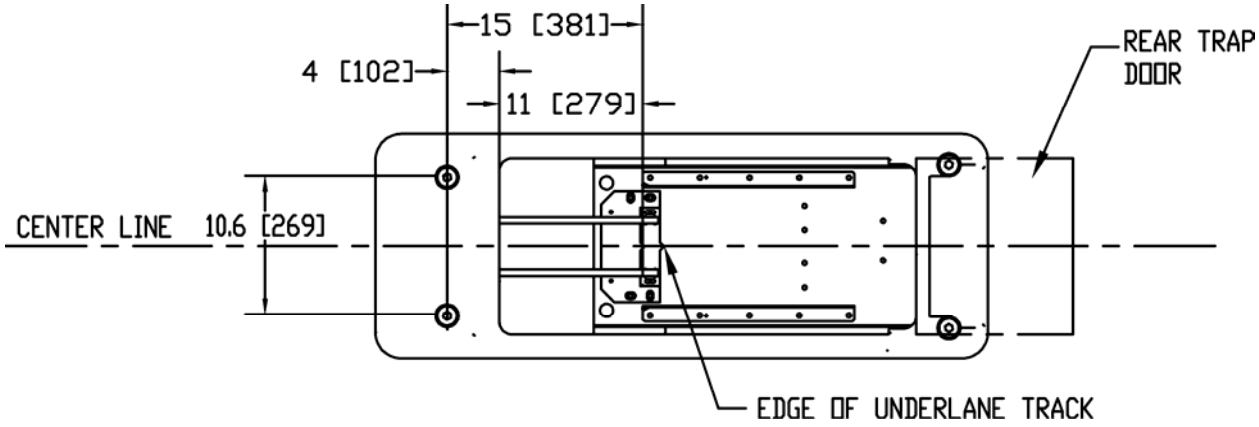


Figure 8, Base Installation

Complete the steps below to install the base, hood, ball rack, and access panel.

1. To install the base, measure 15” from the side of the ball lift towards foul line and draw a line perpendicular to the centerline. Mark 5.3” on either side of the centerline on the line, and drill 5/16-inch pilot holes at the two locations.

2. Position the base (252-002-101), foul lane end towards the foul line, over the cutout so the centerline of the base aligns with the centerline you drew on the approach.

3. Ensure the base is parallel to the center line and the Ball Lift and secure the base to the approach using 2 of the 4 lag screws (810-564-320) and washers (945-867-242) provided.

4. Mark the locations for the back holes using the base as a guide, and drill 5/16-inch pilot holes in the rear trap door. Secure the base with the remaining lag screws and washers.

5. The hood is secured to the base by tabs on the base that snap into slots on the hood. The hood is attached to the access panel which, in turn, is held in place by a three-way bracket that connects the ball rack, ball lift, and hood together. Wait until after the ball rack is installed to complete the hood installation.

6. Assemble the rack by completing the following steps:

    a) Determine whether you want the leg assembly attached to the cross beam at the blower end of the rack or to the cross beam at the middle of the rack.

    b) Attach the pedestal leg using two 5/16-18x1 hex screws (826-057-162) and lock washers (951-156-002).

7. Install the ball rack to the Ball Lift by completing the following steps and referring to Figure 9.

    a) Cut the plastic tie to remove the thick washer and 1/2” lock washer from the Ball Lift’s mounting bracket and set them aside. Leave the grommet bushing in place.

    b) Insert the hex cap screw/stud of the ball rack through the grommet bushing and in the Ball Lift’s mounting bracket. Attach the hardware you set aside in the previous steps in the order shown in Figure 9. Attach the hex nut (844-073-002, from the Hardware Bag) just enough to stay on the screw/stud.

8. Align the centerline of the rack assembly with that of the Ball Lift and use the holes in the base of the pedestal leg as a template to mark the locations for drilling the four pilot holes for securing the rack assembly to the approach.

9. Slide the rack assembly to one side and drill four 5/16-inch pilot holes on the marks you made in the previous step. Reposition the rack assembly to line up the base of the pedestal over the pilot holes

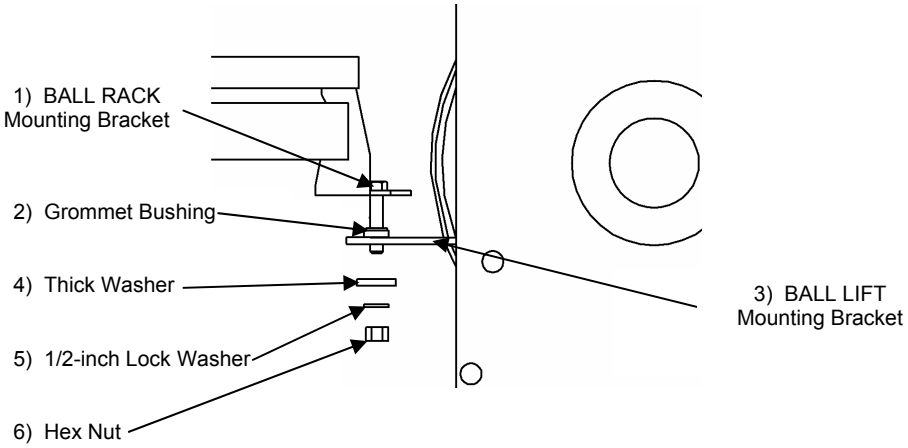


Figure 9, Ball Lift to Ball Rack Attachment

10. Secure the rack assembly to the approach using four 3/8 x 1-1/2-inch lag screws (810-564-240) and washers (948-964-142).

11. Cover the four openings in the base of the pedestal using the black button plugs (248-001-509).

12. Place a level along the length of the top rail of the ball rack (either side) and check for level. If the end of the ball rack attached to the Ball Lift is low, add "C" washers (964-075-921 from the Hardware Bag directly under the mounting bracket of the ball rack. (See Figure 10.)

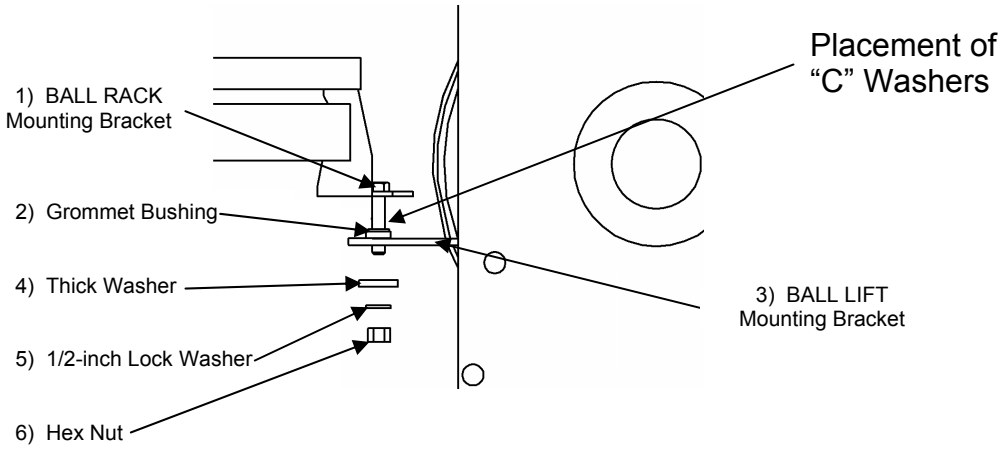


Figure 10, Washer Placement for Ball Rack Leveling

13. Verify that the rack is leveled correctly by placing a bowling ball with no initial speed onto the center rails approximately mid way along the rack. The ball should move toward the end of the rack and pick up enough speed to fall onto the side track.

14. Snap the hood (252-002-102) into place on the base.

15. Insert the access panel so the slot of the mounting bracket (252-002-104) straddles the hex cap screw/stud, so that the bracket is **under** the mounting bracket of the ball rack (and any washers), and **above** the grommet bushing of the ball lift mounting bracket, as shown in Figure 11.

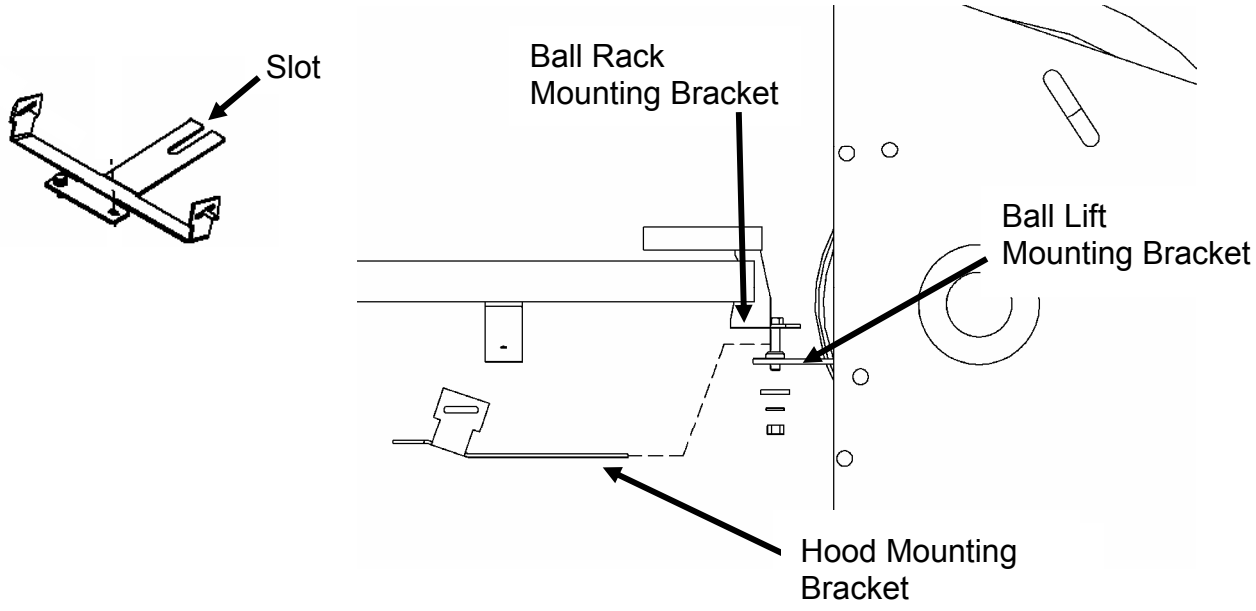


Figure 11, Ball Lift to Ball Rack to Hood Attachment

16. Align the holes in the mounting bracket with the holes in the side of the hood, as shown in Figure 12.

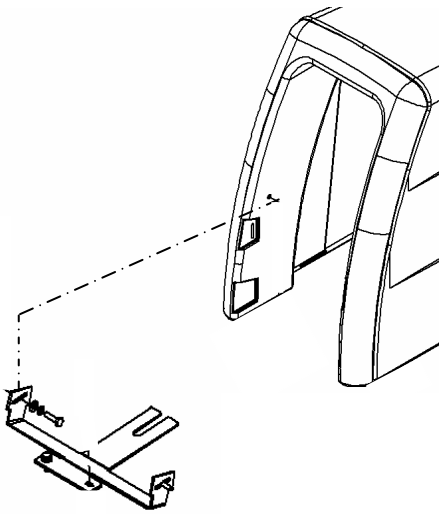


Figure 12, Mounting Bracket to Hood Attachment

17. Secure the bracket to the hood with the screws (809-849-165), split washers (951-148-008), and flat washers (948-753-102). Firmly tighten the screws.

18. Remove the access panel from the mounting bracket. Set aside the screws (809-849-165), split washers (951-148-008), and flat washers (948-753-102).

19. Reach through the opening under the mounting bracket and firmly tighten the 1/2-13 hex nut onto the hex cap screw/stud.

20. Reattach the access panel to the mounting bracket with the hardware you set aside.

21. Firmly tighten the nuts and screws for all connections and attachments.

22. Remove any installation markings that remain on the approach surface.

OPTIONAL LOWER BALL RACK

In addition to the standard ball rack, an optional one-piece lower ball rack that is capable of holding up to ten bowling balls is available. This ball rack is designed to straddle the pedestal of the standard ball rack and to mount directly to the floor. To install the lower ball rack, proceed as follows:

1. Place the lower ball rack in the desired location. It should be level and aligned with the upper ball rack. Position the lower rack's cross bar at the end farthest from the ball return. The exact location isn't critical, but if the cross bar is positioned beyond the end of a raised approach, the area where it will be mounted must be built up so that the rack will be supported properly (see Figure 13).

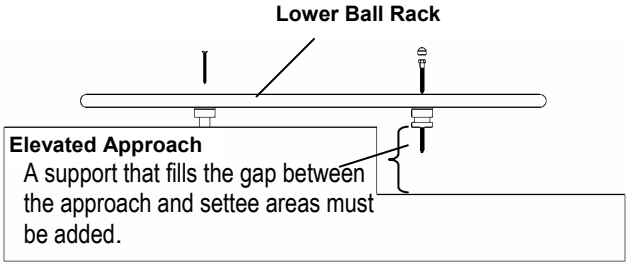


Figure 13, Overhanging Installation

2. Using the two holes in the forward ends of the lower ball rack as a template, drill two 1/8-inch (3-mm) holes three inches (76 mm) deep in the approach flooring.
3. Secure the front end of the rack to the approach using two #14 x 3-inch wood screws (814-847-480).
4. Using the holes in the cross bar as a template, drill two 7/32-inch (6-mm) holes three inches (76 mm) deep.
5. Secure the back end of the lower ball rack using two 3/8 x 3-inch lag screws. Tighten securely.
6. Place nut caps (730-070-375) over the heads of the lag screws to complete the installation.

CONNECTING THE WIRING

WARNING

Before wiring the PROfile Ball Return, all power to the unit must be switched off at the main breaker box or serious injury could result.

CAUTION

To avoid equipment malfunction or damage, the power supply must be rated for the appropriate voltage and current.

1. Verify that the power to the unit and its associated pinspotters is turned OFF at the main circuit breaker.

2. Verify that the circuit voltage and current ratings correspond to those of the Ball Lift. All Ball Lift assemblies are shipped configured for 230-volt operation and, as necessary, must be reconfigured for 115-volt operation as described in this section. (Reconfiguring the motor for 115-volt operation is discussed on Page 7.)

3. Attach the flexible conduit of the power supply cable (234-001-330), which is supplied with the Ball Lift, to the applicable distribution box. Connect the wires in accordance with local electrical codes. For electrical systems containing a neutral wire, such as 115-volt systems in the United States, connect the green and yellow wire to ground, the blue wire to neutral, and the brown wire to line.

4. Remove the cover from the Ball Lift control box, and then remove a lock nut from the center and left grounding (earthing) lugs in the control box.

5. Attach the power supply cable's flexible conduit to the control box at the "AC IN" location shown in Figure 14.

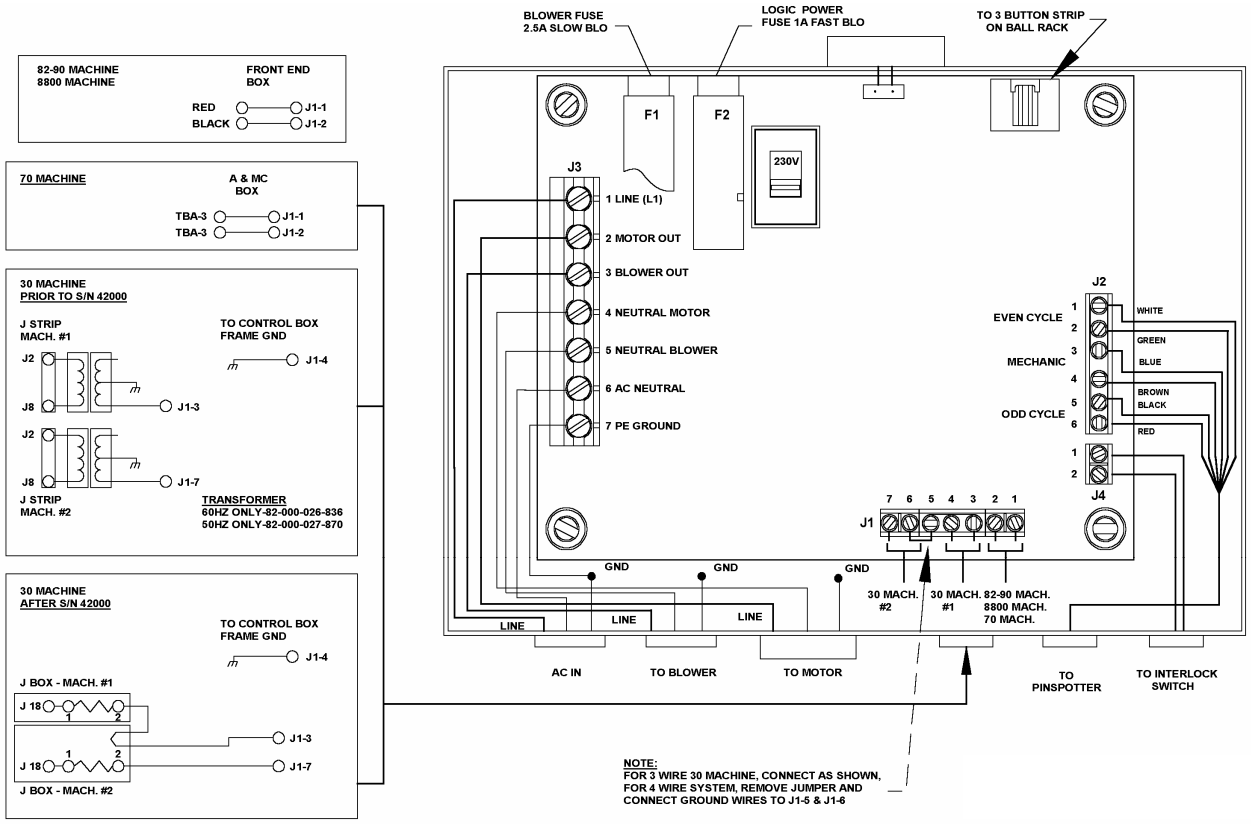


Figure 14, Electrical Connections

6. Attach the ring terminal on the green and yellow ground wire of the power supply cable to the leftmost grounding (earthing) lug inside the control box using one of the lock nuts that was removed in Step 4.

7. Cut off the two spade terminals from the brown and blue power supply wires, and strip approximately 3/8-inch of insulation from the ends of these wires.

8. Connect the blue wire (neutral) to terminal **#6** on junction block **J3** and the brown wire (line) to terminal **#1** on **J3** (see Figure 14).

9. Strip approximately 3/8-inch of insulation from the ends of the brown and blue blower wires (the blower wires exit the end of a ball rack's rail assembly). Route this cable into the control box (see Figure 14). Tighten the cable clamp to secure the cable to the box.

10. Connect the blower's green and yellow ground wire to the center grounding (earthing) lug inside the control box. Secure it using the remaining lock nut that was removed earlier.

11. Connect the blue blower wire to terminal #5 on junction block **J3** and the brown blower wire to terminal **#3** on **J3**.

12. Depending on the specific pinspotters in your bowling center, connect the pinspotter's control wires to junction block **J1** as shown in Figure 14.

13. Plug the connector on the wire harness coming from the 10th frame push buttons and the mechanic call push button on the ball rack into the six-pin connector on top of the control box. When replacing an older style control box (250-001-014) with the new enhanced control box (250-001-850), it will be necessary to install a short adapter cable (282-000-064) between the control box and the wire harness.

14. Route the wires for the mechanic call and pinspotter cycle control (10th frame) circuits coming from the pinspotters into the control box, and connect them to junction block **J2** as follows:

15. Connect the even pinspotter's cycle control (10th frame) wires to terminals **#1** & **#2**.

16. Connect the mechanic call control wires to terminals **#3** & **#4**.

17. Connect the odd pinspotter's cycle control (10th frame) wires to terminals **#5** & **#6**.

18. Secure all of the wires connected to junction blocks **J1** and **J2** to the inside of the control box using the cable clamps provided.

19. Verify that the voltage selector switch on the control board in the Ball Lift control box is selected to the correct voltage – down for 230 volts and up for 115 volts – and install the control box cover.

20. Remove the five screws from the underside of the blower cover, remove the cover, and verify that the blower is wired for the voltage of the circuit connected to the ball lift. There are two 5-pin connectors on the wire harness leading to the blower. One connector is wired for 115-volt power and the other for 230-volt power. Check the tag by each connector and, if necessary, change the connector that is plugged into the blower to match the voltage of the power supply.

21. Reinstall the blower cover.

SETUP AND TESTING

After completing the installation, perform the following steps to ensure proper operation.

1. Turn on power at the main circuit breaker, turn on one of the associated pinspotters, and verify that the speaker on the ball lift control box emits three one-second beeps before the Ball Lift starts.

CAUTION

The Ball Lift contains belts, pulleys, and other moving parts that can present a grabbing and pinching hazard. Keep hands, loose clothing, and jewelry away from moving parts.

2. Check the operation of the Ball Lift's safety switch by carefully depressing the V-wheel guard assembly. The Ball Lift motor should immediately stop and the control box speaker should sound an alarm by emitting a continual beeping sound. **NOTE: on Model 8800 pinspotters equipped with the horizontal ball return (HBR), any time the Ball Lift turns off, the horizontal ball return's motor will also turn off.**

3. Reset the V-wheel guard so that the wheel on the safety switch fits into the detent in the actuator on the end of the guard's pivot rod. The Ball Lift should not restart.

4. To silence the audible alarm, SIMULTANEOUSLY press all three buttons (the two 10th frame buttons and the mechanic call button) on the end of the ball rack. The beeping should stop, but the Ball Lift should not restart. Approximately every 30 seconds the speaker will emit a single beep as a reminder that the Ball Lift is not in the NORMAL Mode.

5. To reset the emergency stop condition and restart the Ball Lift, SIMULTANEOUSLY press both 10th frame push buttons on the end of the ball rack. The speaker should emit three beeps and the Ball Lift should restart. (The HBR motor, as applicable, should also restart.)

6. The Ball Lift can be placed in a "Forced-OFF" condition. This will turn off the Ball Lift even though one (or both) associated pinspotters is (are) operating. To place the Ball Lift in a "Forced-OFF" condition, SIMULTANEOUSLY press the mechanic call button and the EVEN lane's 10^{th} frame push button on the end of the ball rack. The Ball Lift should stop without delay. The speaker will emit a beep every 30 seconds as a reminder that the Ball Lift is not in the NORMAL Mode.

7. To return the Ball Lift to normal from a "Forced-OFF" condition, SIMULTANEOUSLY press both of the 10^{th} frame push buttons on the end of the ball rack. The Ball Lift's speaker should emit three beeps and the motor should restart.

8. Turn off the pinspotters and wait for the Ball Lift to turn off. **There is a built-in time delay of 30 seconds before the Ball Lift turns off. This allows any bowling balls in the system to return through the Ball Lift to the ball rack.**

9. The Ball Lift can be placed in a “Forced-ON” condition allowing the Ball Lift to operate even when both pinspotters are off. To place the Ball Lift in the “Forced-ON” condition, SIMULTANEOUSLY press the mechanic call button and the ODD lane’s 10th frame push button on the end of the ball rack. The Ball Lift’s speaker will emit a single beep and the ball lift will start. The speaker will emit a beep every 30 seconds as a reminder that the Ball Lift is not in the NORMAL Mode.

10. To return the Ball Lift to normal from a “Forced-ON” condition, SIMULTANEOUSLY press both of the 10th frame push buttons on the end of the ball rack. The Ball Lift should turn off.

11. Turn on the pinspotters and return a few balls through the Ball Lift. Adjust the transition brackets, as needed, to obtain a smooth transfer of the ball to the ball rack.

12. Press each 10th frame (cycle) push button on the ball rack and verify that the corresponding pinspotter cycles properly.

13. Verify that the blower is functioning properly (The blower turns on and off together with the Ball Lift motor).

14. Press the mechanic call button and verify a signal is received at the back of the pinspotter. If pit signal kit is installed, light will come on. If the new XLi chassis are used in the center, stack light will alternately flash green and red.

15. When the results of these tests are satisfactory, the Ball Lift may be placed into service.

OPERATION

The Operation of the PROfile Ball Lift is very simple. The Ball Lift starts when you start either of the two associated pinspotters, and will continue to run for 30 seconds after both pinspotters are turned off to allow any bowling balls in transit to pass through the lift and return to the ball rack.

OPERATIONAL SAFETY

There is a safety switch built into the Ball Lift to protect against someone placing a hand inside the lift and having it grabbed by the V-wheel and pulled further into the machinery. The switch is actuated by a guard that when moved from its normal position will actuate the safety switch stopping the Ball Lift. **EVEN THOUGH THIS SAFETY SWITCH IS DESIGNED TO PREVENT INJURY, NEVER PLACE A HAND INSIDE THE MECHANISM WHILE IT IS IN OPERATION.**

A moving bowling ball contains a considerable amount of energy and can appear at the outlet opening of the Ball Lift with little or no warning. Keep hands away from the exit opening to prevent injury.

There are two urethane transition pads at the mouth of the Ball Lift's exit opening. When adjusted properly, these pads reduce the forward momentum and rotation of the ball so that it enters the rack section with minimal energy. The task that these pads must perform has been compounded by the advent of new bowling ball materials and technology. These pads must be adjusted to assure that the lightest bowling balls as well as the new "reactive" bowling balls exit the lift satisfactorily. A slick, oil coated, heavy bowling ball may still have significant momentum after exiting the Ball Lift. For this reason, **a pinching hazard can exist when two bowling balls come together on the rack. KEEP HANDS CLEAR OF THE BALL RACK UNTIL THE RETURNING BALL COMES TO REST**.

BALL LIFT CONTROLS

Ball Lift operation is normally controlled by the operation of its associated pinspotters. Whenever either pinspotter is in operation, the Ball Lift is in operation. When both pinspotters are turned off, the Ball Lift turns off after a 30-second time delay, which allows any bowling balls that have been played to return to the ball rack.

The Ball Lift can also be controlled manually through the operation of the two 10th frame push buttons and the mechanic call push button on the end of the ball rack. Normally, when any one of these buttons is pressed, it initiates the operation of the associated equipment; that is, the 10th frame switches cause the associated pinspotter to cycle to spot or respot pins, and the mechanic call button turns on a light (optional pit signal or XLi chassis is needed) alerting the center mechanic to an equipment problem. Operating the three push buttons simultaneously in various combinations, however, causes the Ball Lift to function in a different manner as described below and summarized in Table 1.

The Ball Lift has several different modes of operation: **NORMAL**, **FORCED-ON**, **FORCED OFF**, and **EMERGENCY**.

NORMAL mode allows Ball Lift Operation to be controlled by the pinspotters as discussed above. When a pinspotter is turned on, the Ball Lift speaker will emit three one-second warning beeps before starting. The Ball Lift normally starts in this mode.

FORCED-ON operation allows the Ball Lift to be operated even though both associated pinspotters are turned off. To place the Ball Lift in the FORCED-ON condition, SIMULTANEOUSLY press the mechanic call button and the ODD lane's 10th frame push button. The Ball Lift will beep once and then start. The Ball Lift will continue to emit a beep at 30-second intervals as a reminder that the Ball Lift is not in the NORMAL Mode.

To return Ball Lift operation to normal, SIMULTANEOUSLY press both of the 10th frame push buttons.

FORCED-OFF operation allows the Ball Lift to be turned off without turning off the associated pinspotters. To place the Ball Lift in a FORCED-OFF condition, SIMULTANEOUSLY press the mechanic call button and the EVEN lane's 10th frame push button. The Ball Lift will turn off without delay. On pinspotters equipped with the horizontal ball return (HBR), the HBR motor will turn off whenever the Ball Lift turns off and will restart when the Ball Lift restarts. While in the FORCED-OFF condition, the Ball Lift will beep once every 30 seconds as a reminder that the Ball Lift is not in the NORMAL Mode.

NOTE: The Ball Lift can be placed in the FORCED-OFF condition even if it is not currently operating, as long as control power is available. When an associated pinspotter is subsequently turned on, the Ball Lift will not start, but will continue to emit a beep every 30 seconds as a reminder that the Ball Lift is not in the NORMAL Mode.

To return Ball Lift operation to normal, SIMULTANEOUSLY press both 10th frame push buttons. If a pinspotter is in operation, the Ball Lift will beep three times before starting.

EMERGENCY mode is activated by the operation of the safety interlock, which is designed to minimize injury should someone place a hand in the Ball Lift's outlet opening during operation. When the Ball Lift's safety interlock is actuated, the Ball Lift immediately turns off and emits a continual beeping alarm. Removing the hand and resetting the interlock's V-wheel guard will not reset the Ball Lift's operation to normal. This is to prevent the Ball Lift from inadvertently restarting should the V-wheel guard be reset while removing the hand from the machine.

(Emergency Mode continued)

To silence the audible alarm, SIMULTANEOUSLY press all three push buttons on the end of the ball rack. The Ball Lift will beep at 30-second intervals as a reminder that the Ball Lift is not in the NORMAL Mode.

To return the Ball Lift to normal operation, verify that the outlet opening has been cleared, reset the V-wheel guard, and then SIMULTANEOUSLY press both of the 10th frame push buttons.

Table 1, Ball Lift Operation

Push Button Designation

ODD Lane's 10th Frame Button = 1
Mechanic Call Button = 2
EVEN Lane's 10th Frame Button = 3

***Push buttons must be pressed simultaneously; otherwise, the normal function of the button will be executed.**

Mode	To Initiate	Audible Warning	To Return to Normal Operation
Normal	Startup Default	3 one-second beeps	N/A
Forced-ON	Press 1 & 2*	1 one-second beep plus beep every 30 seconds	Press 1 & 3*
Forced-OFF	Press 2 & 3*	beep every 30 seconds	Press 1 & 3*
Emergency	Actuate Safety Interlock Switch	continual beeping or 1 beep every 30 seconds when silenced	To Silence Alarm: Press 1, 2, & 3* To Return to Normal: Press 1 & 3*

OTHER FEATURES

The ball rack is designed to stagger the balls as they return, first to the left, or odd, lane and then to the right, or even, lane. This arrangement allows more bowling balls to be accommodated on the rack when compared to a single, straight-line design while still allowing easy access from either side of the rack. This is accomplished by having the ball exit the Ball Lift on the center two rails of the ball rack and then deflecting the ball to the left set of rails when it touches the semicircular deflector that is molded into the blower housing at the end of the rack. Subsequent balls are deflected to the opposite side of the rack when they contact an existing ball since contact is made "off center" due to the position of the existing ball. The rails have a slight downward slope to help maintain the momentum of the ball and assure adequate deflection energy.

There is also a blower built into the end of the ball rack that operates continuously when the Ball Lift is in operation.

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SERVICE

The Ball Lift requires very little maintenance. All of the ball bearings on the lift and in the motor are sealed and lubricated for life. There are several wear items described below that should be monitored periodically and replaced as necessary. The most critical factor in assuring long and trouble-free operation is the transition between the underlane track and the Ball Lift. The better the alignment of these components, the smoother the handoff is. Whenever banging is heard as a ball enters a lift, it is a sign that the alignment is out of adjustment and should be corrected.

The Ball Lift mounting hardware can become loose either where the track joins the lift or where the lift is secured to the subfloor. If the screwbolts that mount the lift to the subfloor are loose, tighten them, but do not exceed 50 ft-lbs. of torque. It is a good idea to inspect these attachments periodically especially for the first few months following Ball Lift installation.

When the alignment is correct, the Ball Lift will be centered along a continuation of the centerline of the underlane track, and when a bowling ball is placed on the track where it joins the lift, there will be equal clearance between the ball and side plates.

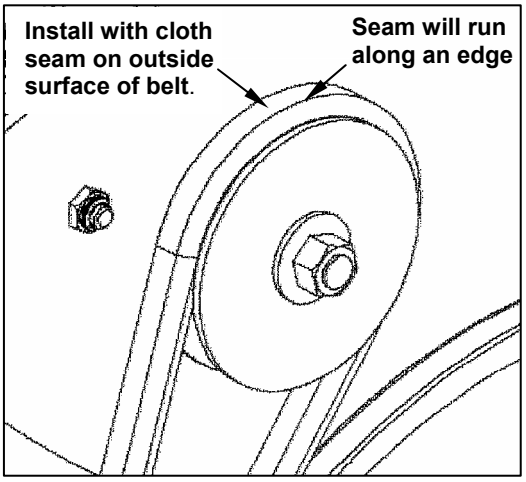


Figure 15

If there is a protective cloth overwrap surrounding the belt, **INSTALLING THE BELT WITH THE PROTECTIVE OVERWRAP'S SEAM ON THE OUTSIDE SURFACE OF THE BELT (see Figure 15) WILL PROVIDE THE LONGEST BELT LIFE.**

WEEKLY

- Observe the operation of each of the lifts. Wipe down the shroud, ball rack, and transition blocks to remove oil and handprints. Make any necessary adjustments.
- Press the 10th frame push buttons and verify proper response from the pinspotters. Verify the operation of the mechanic call button. The three push buttons can be replaced individually. The blower housing is designed to allow disassembly for this purpose.
- With the Ball Lift running, verify that the blower is operating. If not, check the fuse located on the top of the Ball Lift control box. If the fuse is bad and blows again after being replaced, replace the blower.

MONTHLY

- Inspect the V-belt. Some cracks may appear after moderate use. If the cracks are very deep or the belt starts to split or delaminate, replace the belt. Each bowling center should develop a belt replacement schedule based on lineage rather than on

the calendar. This method maximizes useful belt life while minimizing inconvenience to the bowler due to belt failure during play.

- With the Ball Lift OFF, check the V-belt tension. You should be able to deflect the belt approximately 3/8 inch when pressed in the middle of the longest unsupported span. During operation the belt should not slip or flap. To adjust the tension, turn the Ball Lift OFF and loosen the nut on the idler pulley. Slide the idler assembly along the slot in the side panel to either increase or decrease belt tension. When the tension is correct, tighten the nut.

- Return a ball through the ball lift and observe the braking action of the transition blocks. The momentum of the ball should be significantly reduced, and there should be no jumping or bouncing of the ball. Inspect the urethane transition pads. Replace them before they become so worn that they allow the bowling ball to contact metal, or if they are badly gouged or no longer function adequately to slow the ball as it exits the Ball Lift.

QUARTERLY

- Inspect the Ball Lift's urethane-coated rails, especially where the ball enters the lift and where the ball transitions onto the upper set of rails. Replace the rails before they wear through to the metal tubing. Each rail is secured to the side plate by three hex socket cap screws and lock nuts. There are urethane spacers between the rail and the side plate at each screw. Replace these spacers if they are missing or damaged. They provide proper spacing and help cushion other components from the impact of the ball. Tighten any loose hardware.

- Inspect the upper and lower V-wheels. These items are very tough and should provide a very long life, but can be damaged from use. To replace a V-wheel, remove the three bolts that secure it to the upper or lower shaft assembly and install a new wheel in its place. Tighten the three bolts securely.

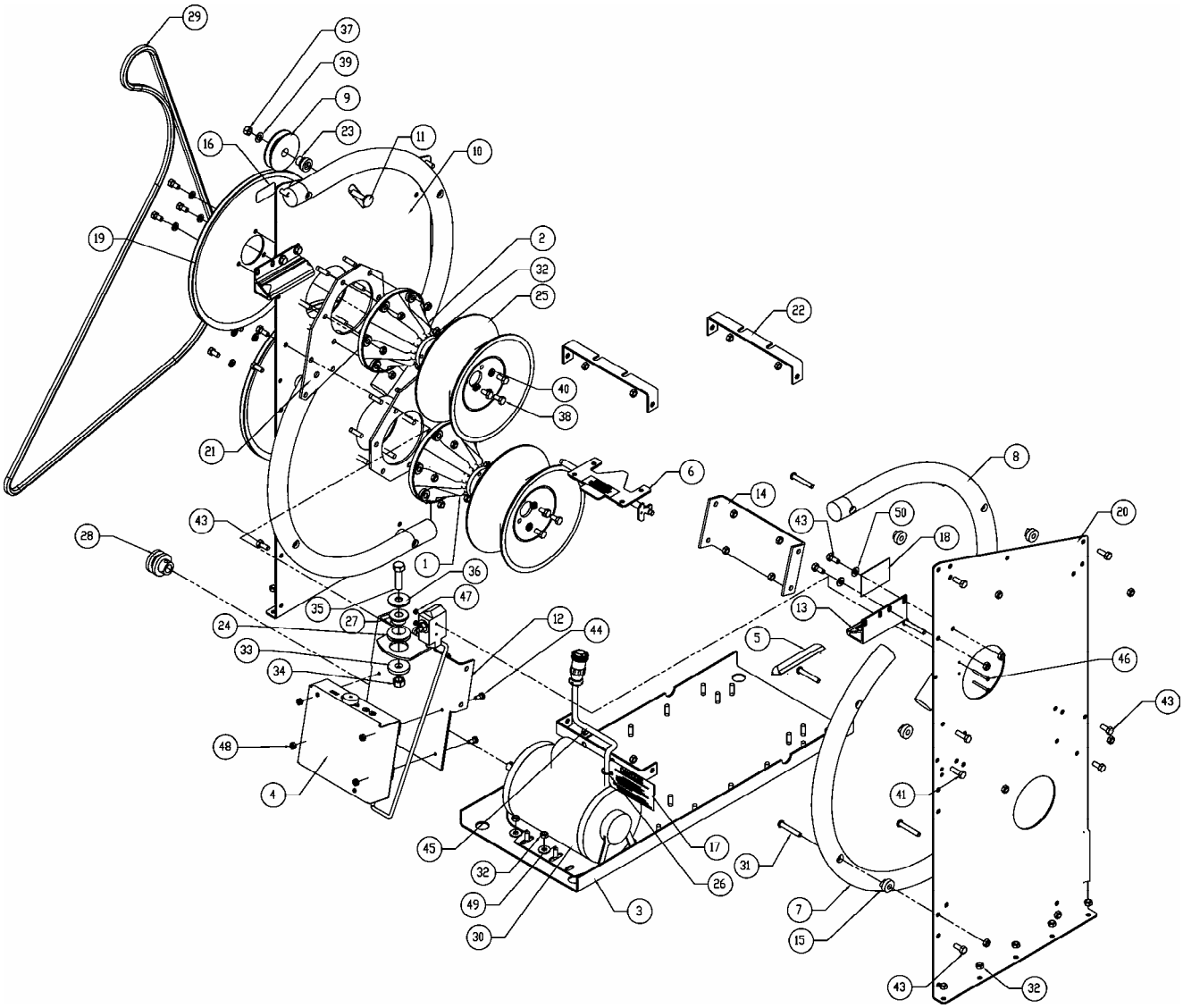
- Check the operation of the safety switch. The guard should pivot freely, and when actuated, the Ball Lift should turn off immediately and sound an audible alarm. Lubricate the pivot shaft where it passes through the side plates sparingly as needed. Reset the switch actuator and return the Ball Lift to the NORMAL Mode.

- Wipe up or vacuum out any accumulated debris. Inspect the brackets for damage and check for the smooth operation of the pulleys, bearings, etc. With the V-belt removed, the lower large pulley should be capable of rotating independently of its associated V-wheel when turned in the clockwise direction, but should immediately lock up and rotate as a unit with the V-wheel when rotated in the counterclockwise direction. This arrangement allows the V-wheel to momentarily rotate faster than the pulley without causing stress to the drive components when a ball first enters the Ball Lift.

  For replacement part numbers, refer to the Drawings and Part Numbers section at the back of this manual.

PROfile Ball Lift

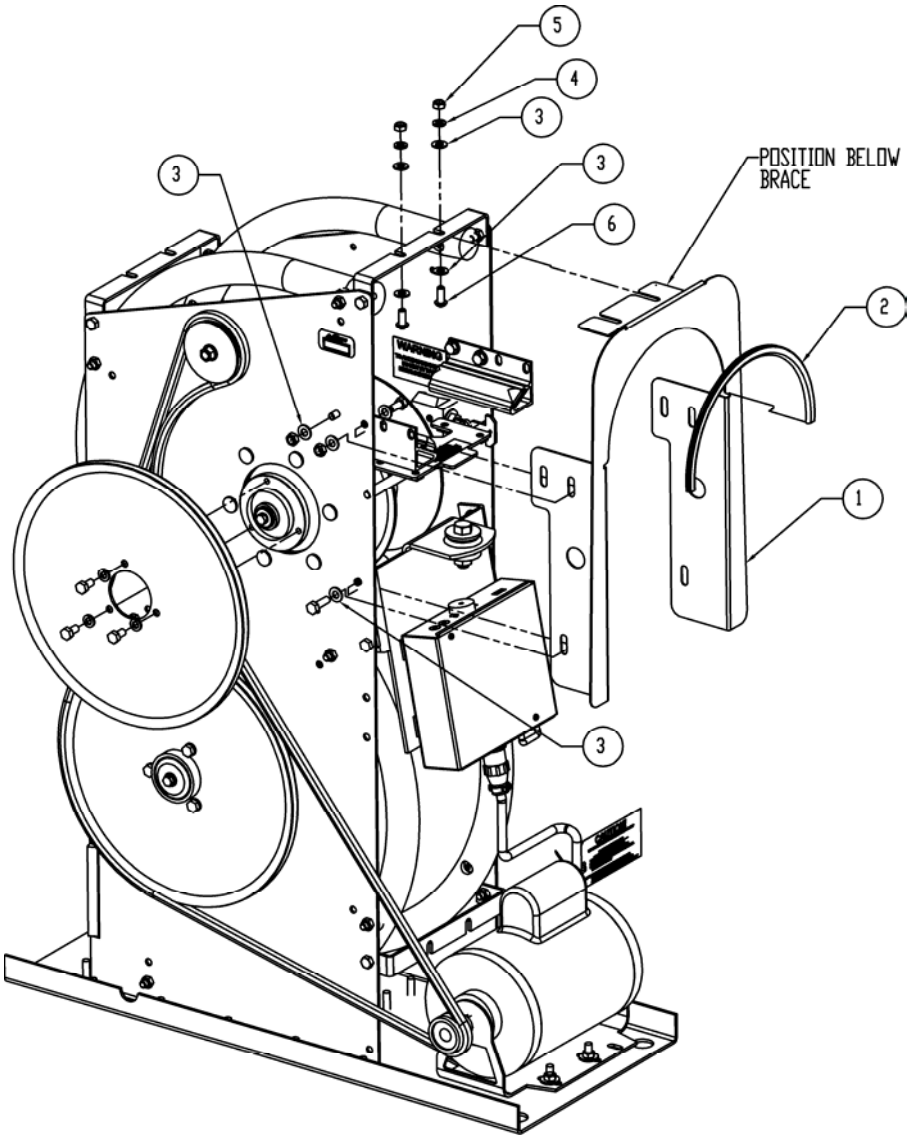
Drawings & Parts Lists



250-001-001
Profile Ball Lift

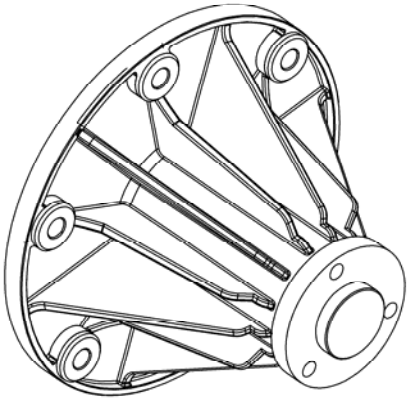
250-001-001 Ball Lift

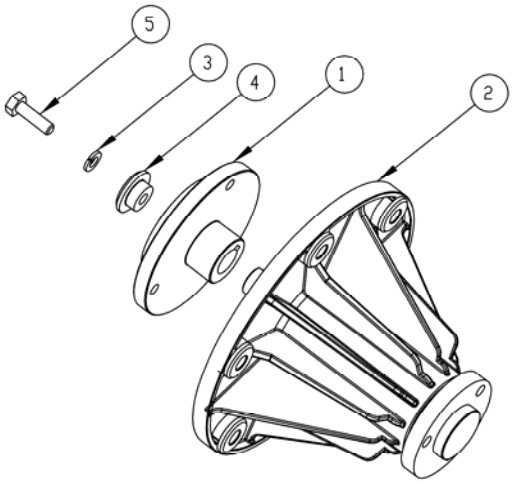
	Part No.	Description	Qty
1	250-001-127	Lower shaft assembly	1
2	250-001-126	Upper shaft assembly	1
3	250-001-003	Base plate assembly	1
4	250-001-110	Control box w/safety switch assembly	1
5	250-001-109	Transition pad assembly	2
6	250-004-056	V-wheel guard assembly	1
7	250-001-013	Lower track assembly	2
8	250-001-012	Upper track assembly	2
9	250-001-085	Idler pulley	1
10	250-001-002	Left side assembly	1
11	250-001-108	Idler stud	1
12	250-002-207	Support bracket	1
13	250-001-107	Transition pad mount	2
14	250-001-106	Brace	1
15	250-001-034	Rail spacer	12
16	250-001-105	Serial Number Tag	1
17	250-001-104	115V Motor Decal	1
18	250-001-103	Warning Label, Interlock switch	1
19	250-001-057	Pulley	2
20	250-001-062	Right side plate	1
21	250-001-054	Stiffener plate	2
22	250-001-023	Spacer bracket	3
23	250-001-102	Idler shaft	1
24	250-001-046	Grommet	1
25	250-001-051	V-wheel, PROfile Ball Return	2
26	770-013-043	Panduit Strap	1
27	250-001-047	Bushing	1
28	250-001-537	Pulley (cast iron sheave)	1
29	250-001-037	V-belt	1
30	250-001-116	Motor	1
31	808-557-320	Screw, button head, 5/16-18 x 2	12
32	844-057-002	Lock nut, 5/16-18, Stover	56
33	000-021-787	Flat washer, 9/16 x 1-5/8 x 1/4	1
34	844-073-002	Lock nut, 1/2-13, flex	1
35	809-873-280	Screw, Hex 1/2-13 X1-3/4	1
36	941-076-260	Flat washer, 9/16 x 1-5/8 x 1/8	1
37	839-665-002	Lock nut, 3/8-16, flex	1
38	809-857-100	Screw, hex, 5/16-18 x 5/8	12
39	948-767-132	Flat washer, 13/32	1
40	951-156-002	Lock washer, 5/16 split	12
41	809-857-165	Screw, hex, 5/16-18 x 1	4
42	809-857-145	Screw, hex, 5/16-18 x7/8	4
43	809-857-125	Screw, hex, 5/16-18 x 3/4	10
44	809-849-100	Screw, 1/4 -20 X 5/8, hex head, black	4
45	250-001-115	Ball lift motor cord (with connector)	1
46	812-627-242	Screw, round head, 6-32 x 1-1/2	2
47	843-127-002	Nut, 6-32 keps	2
48	844-049-002	Nut, 1/4 -20, stover GR 8, zinc	4
49	948-964-142	5/16 USS flat washer	4
50	948-722-111	Washer, 5.16. SAE, flat, black oxide	4



252-002-146
Hand Guard Kit – Profile

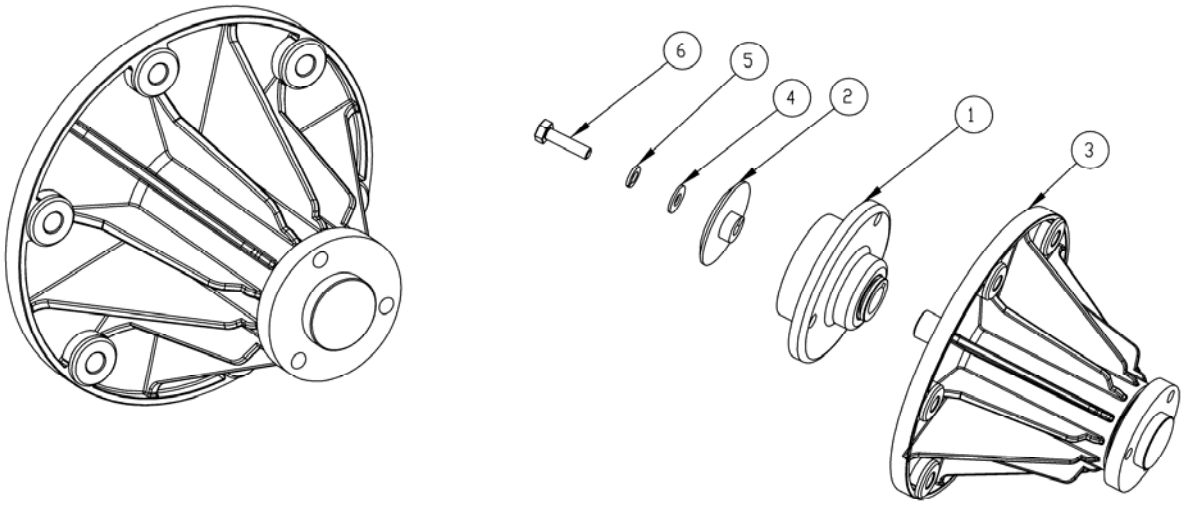
	Part No.	Description	Qty
1	252-002-142	Ball Lift Hand Guard Profile	1
2	04-069(4)	Edge Trim, 14.88”	1
3	948-722-111	Washer, 5/16, SAE, Flat, Black Oxide	10
4	951-156-002	Washer, Split Lock, 5/16	2
5	844-057-002	Nut, Stover Lock, 5/16-18, Zinc	2
6	808-557-120	Screw 5/16-18 X 3/4, Button Head	2





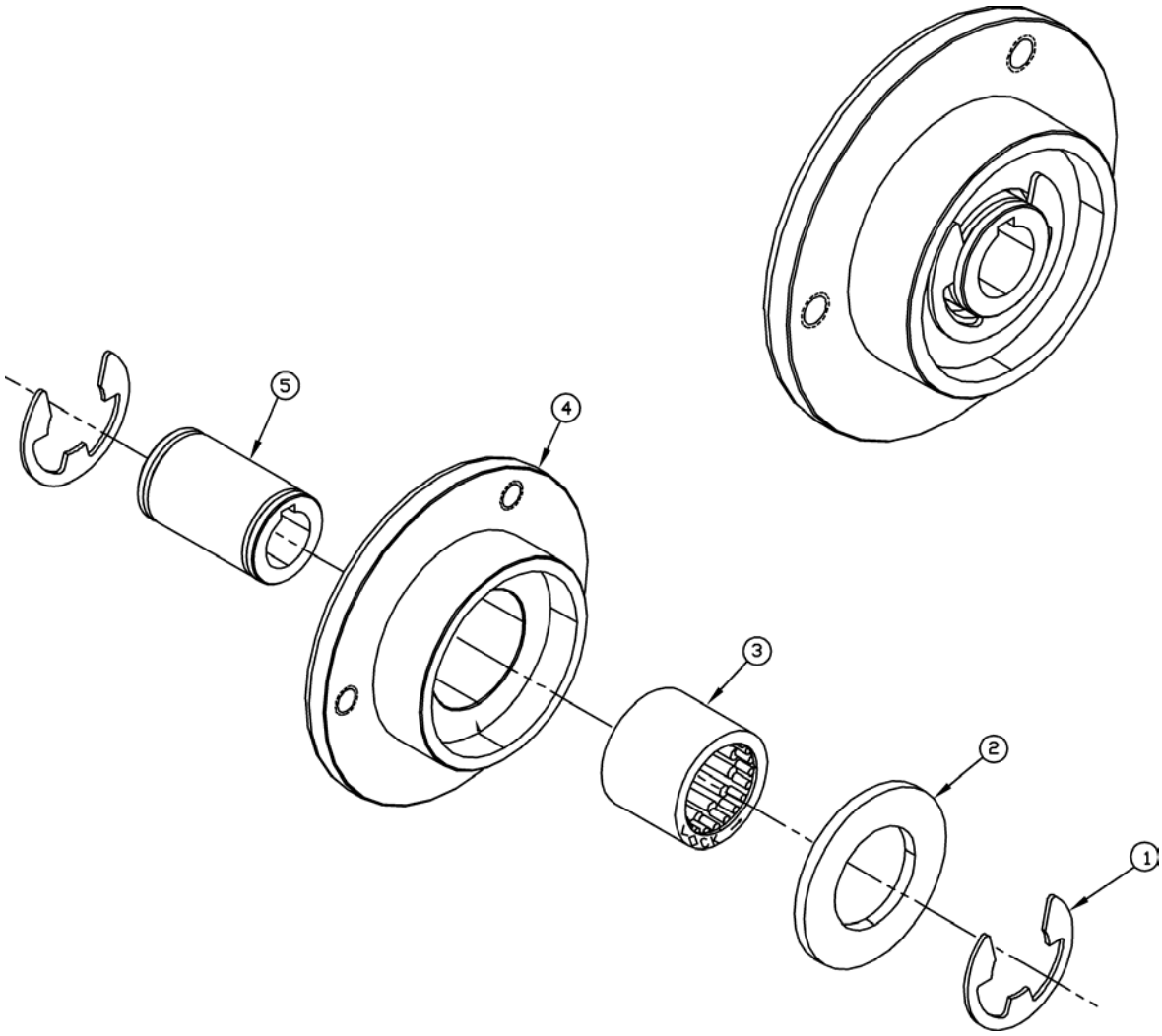
250-001-126
Upper Shaft Assembly

	Part No.	Description	Qty
1	250-001-060	Hub	1
2	250-001-128	Plastic Bell Housing	1
3	951-148-002	Washer, ¼, split, zinc	1
4	250-001-226	Pulley washer	1
5	809-849-145	1/4 -20 X 7/8 Hex Head Screw	1



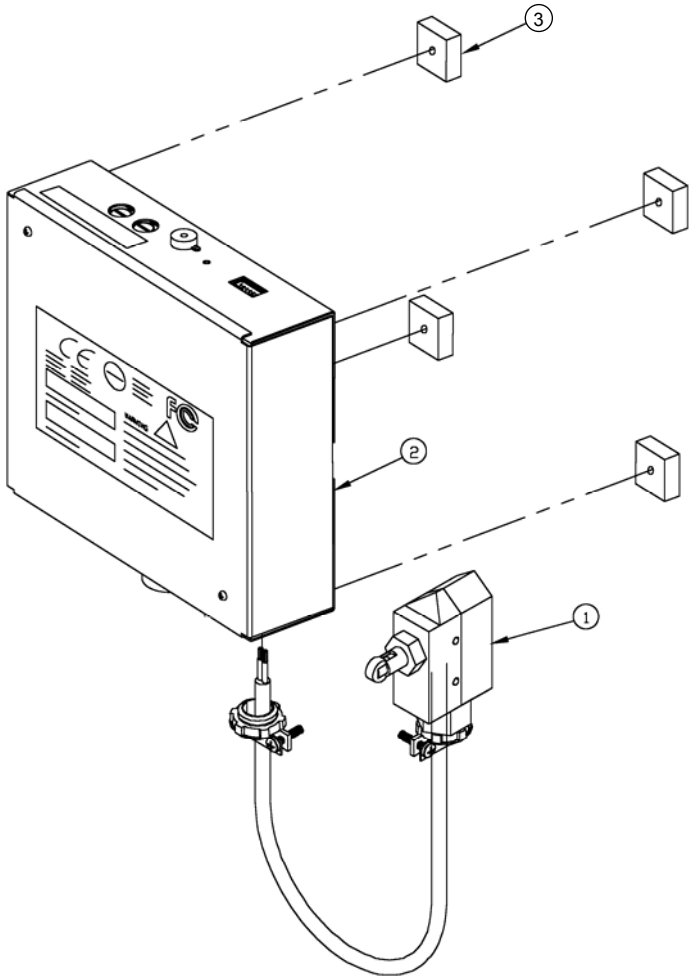
250-001-127
Lower Shaft Assembly

	Part No.	Description	Qty
1	250-001-008	Clutch Housing Assembly	1
2	250-001-231	Clutch Cover	1
3	250-001-128	Plastic Bell Housing	1
4	948-743-101	Washer, 1/4, Flat, Black Oxide	1
5	951-148-002	Washer, 1/4, split, zinc	1
6	809-849-165	Screw, 1/4-20 X 1, Hex Head, GR 8, Black	1



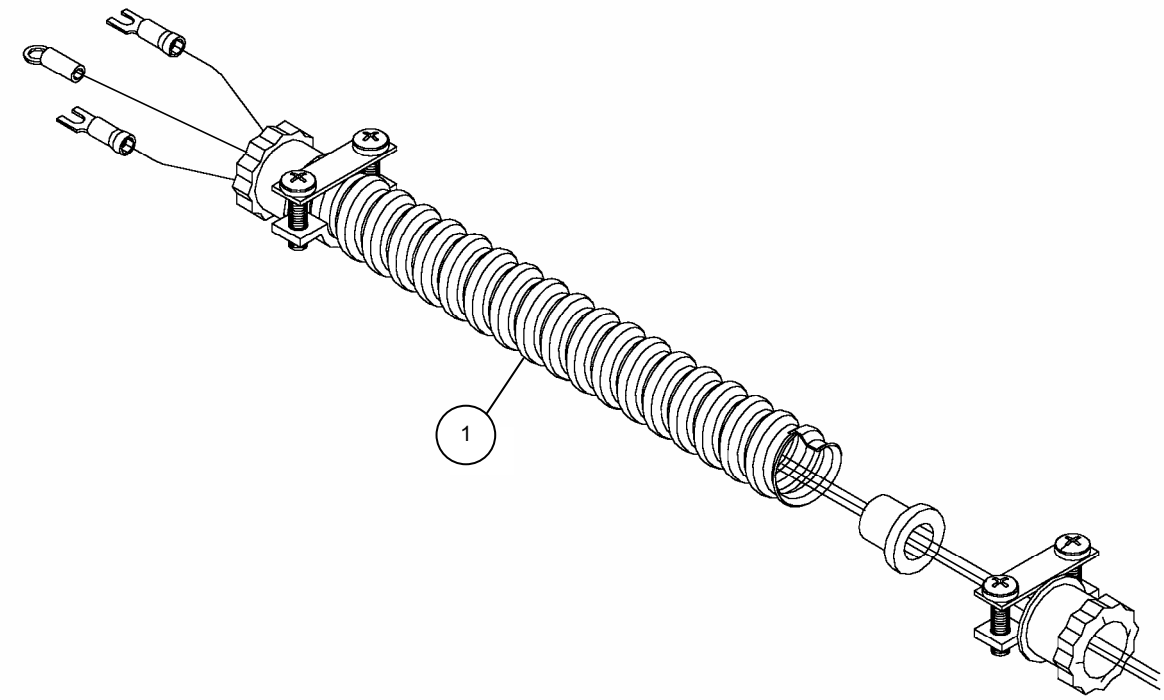
250-001-008
Clutch Housing Assembly

	Part No.	Description	Qty
1	919-010-910	Retaining ring	2
2	941-092-320	1-inch wrought washer	1
3	070-007-291	Roller clutch	1
4	250-001-053	Clutch housing	1
5	250-001-234	Clutch sleeve	1
6	700-112-830	RTV silicone gasket (not shown)	A/R



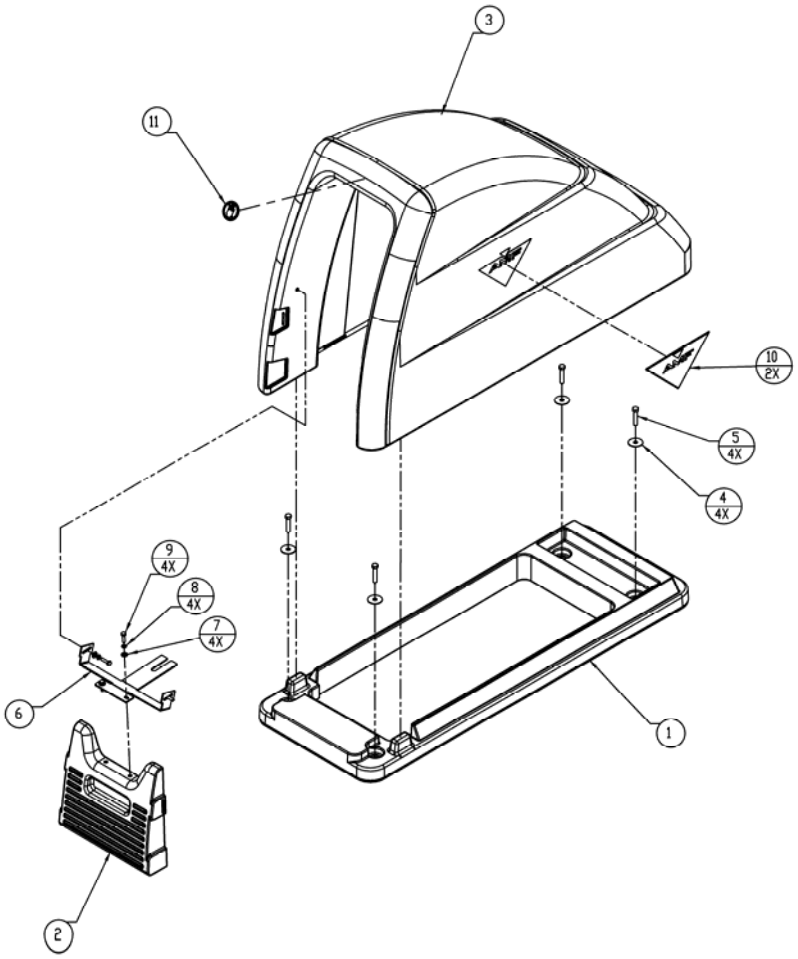
250-001-110
Control Box with Safety Switch

	Part No.	Description	Qty
1	250-001-046	Safety switch assembly	1
2	250-001-850	Enhanced control box w/circuit board	1
3	250-001-673	Dampener	4



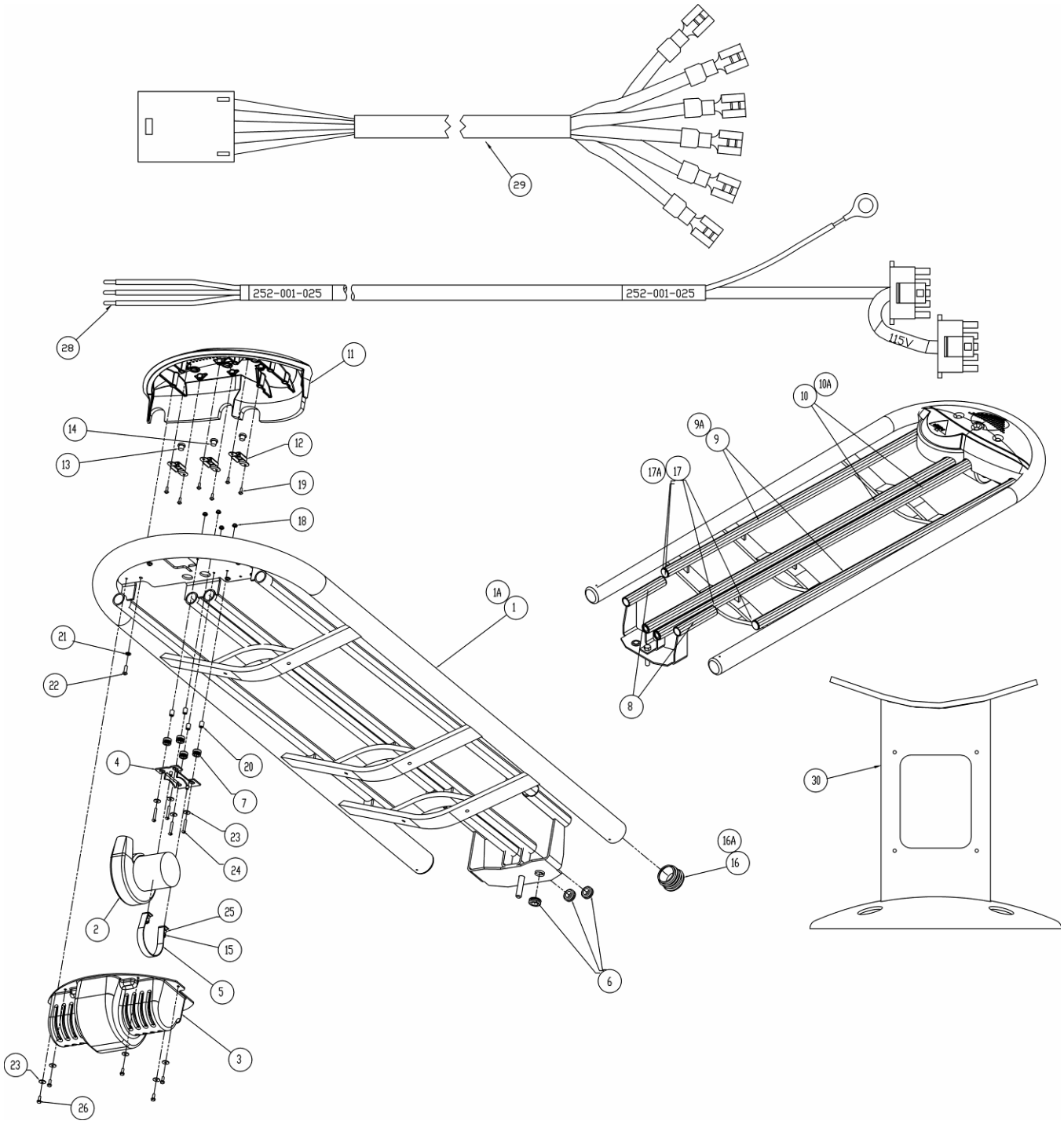
234-001-330
Main Power Cable Assembly

	Part No.	Description	Qty
1	234-001-330	Main power cable assembly	1



252-002-100
Hood Assembly - Molded

	Part No.	Description	Qty
1	252-002-101	PROfile base - molded	1
2	252-002-103	PROfile access door - molded	1
3	252-002-102	PROfile hood - molded	1
4	945-867-242	Washer: 406 ID x 1.5 OD x .063	4
5	810-564-320	Screw: 3/8 x 2, lag, hex head	4
6	252-002-104	Mounting bracket - access hood	1
7	948-753-102	Washer: 1/4, flat	4
8	951-148-008	Washer: 1/4, split	4
9	809-849-165	Screw: 1/4-20x1, hex head	4
10	252-002-107(1)	Dometag-Urethane AMF Logo	2
11	252-002-140	Stay Clear Warning Label	1



PROFile Ball Rack Assembly
252-002-120 – 11 Ball Rack Assembly
252-001-008 – 15 Ball Rack Assembly
252-002-105 – Leg Assembly

252-002-120
11-Ball Rack Assembly

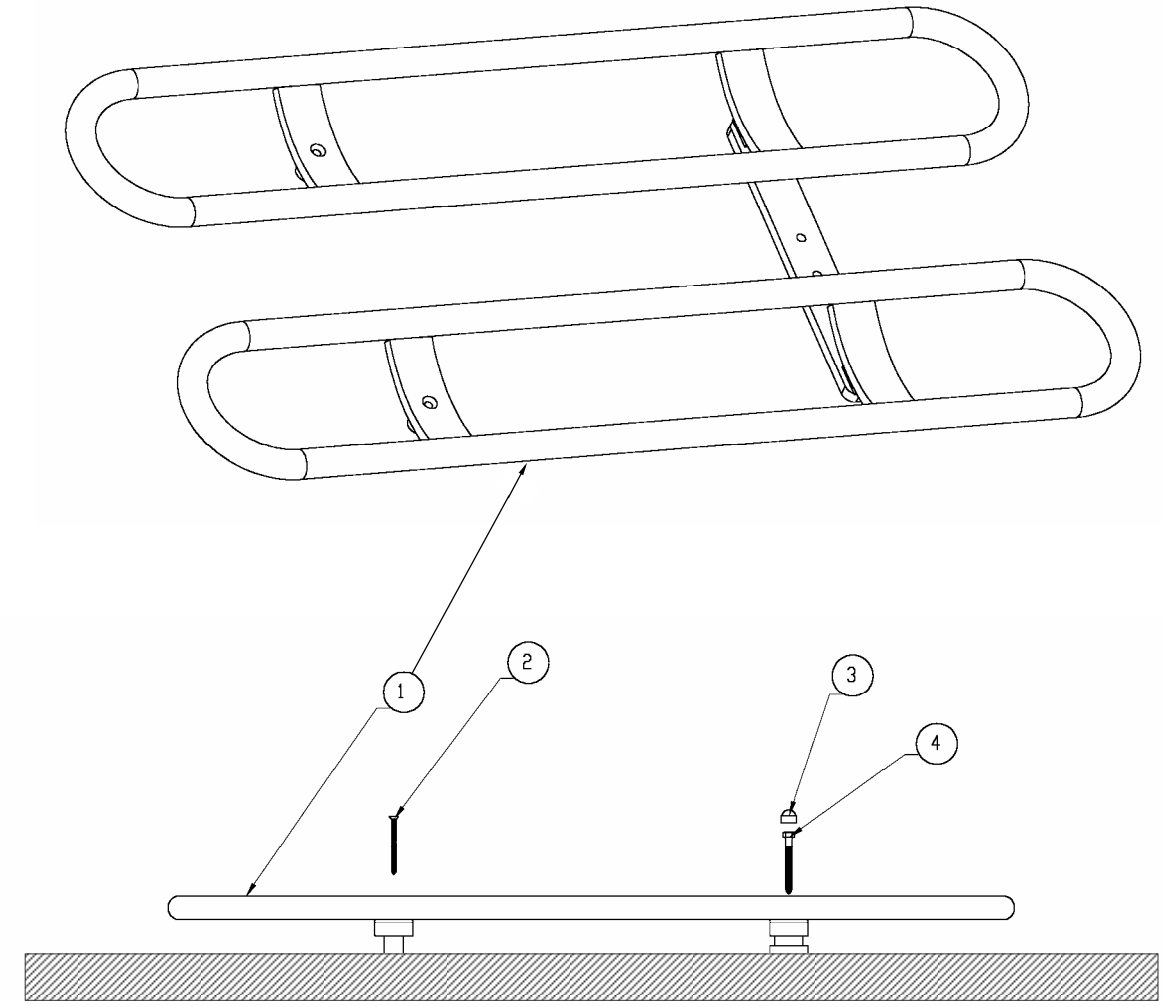
	Part No.	Description	Qty
1	252-001-150	Upper Rack Weldment (11 Ball)	1
2	252-001-066	Blower Fan Assembly	1
3	252-001-027	Blower Cover	1
4	252-001-088	Blower Bracket	1
5	252-001-089	Blower Strap	1
6	711-520-017	Grommet, Minor Rubber	3
7	711-564-728	Grommet, Minor Rubber	4
8	252-001-125	Cover Guide Tube Glow Strip	2
9	252-001-155	Inner Rail Cover W/Stripes	2
10	252-001-154	Center Rail Cover, Glow Stripes	2
11	252-001-086	Upper Ball Housing	1
12	252-001-090	Button Bracket	3
13	252-001-097	Blue Push Buton	2
14	252-001-096	Black Push Button	1
15	839-249-007	Nut, Hex Heavy 1/4-20 w/Nylon Insert	2
16	252-001-030	End Cap -2.25 DIA (Round)	2
16A	259-001-035	End Cap -2.25 DIA (Flat)	2
17	250-002-005	End Cap – 1.25 DIA (Round)	4
17A	259-001-036	End Cap – 1.25 DIA (Flat)	4
18	838-740-002	Nut, Hex Locknut, #10-32	4
19	818-233-082	Screw, #8-32 x .500, Phil, Pan, Sems	6
20	722-564-720	Spacer, 3/8 x 1/2 x #10 Nylon	4
21	951-148-002	Lock washer, 1/4 split	6
22	808-549-120	Screw, Hex 1/4-20x3/4	6
23	941-137-102	Flat washer, 3/8 x 5/8 x 1/16	9
24	814-638-207	Screw, #10-32 x 1-1/4 Slot HD, M/S, Zinc	4
25	948-746-810	Flat washer, 1/4	2
26	818-740-082	Screw, #10-32 x 1/2 Hex Washer	5
27	822-626-081	Screw: #6x1/2 phillips, pan head (Not Shown)	2
28	252-001-025	Blower Cable	1
29	252-002-136	Cable, Ball Tray Tenth Frame Switch	1

252-001-008
15 Ball Rack Assembly

	Part No.	Description	Qty
1A	252-001-009	Upper Rack Assembly, (15 ball)	1
9A	252-001-122	Inner rail cover w/Glow stripes (15-ball)	2
10A	252-001-121	Center rail cover w/Glow stripes (15-ball)	2

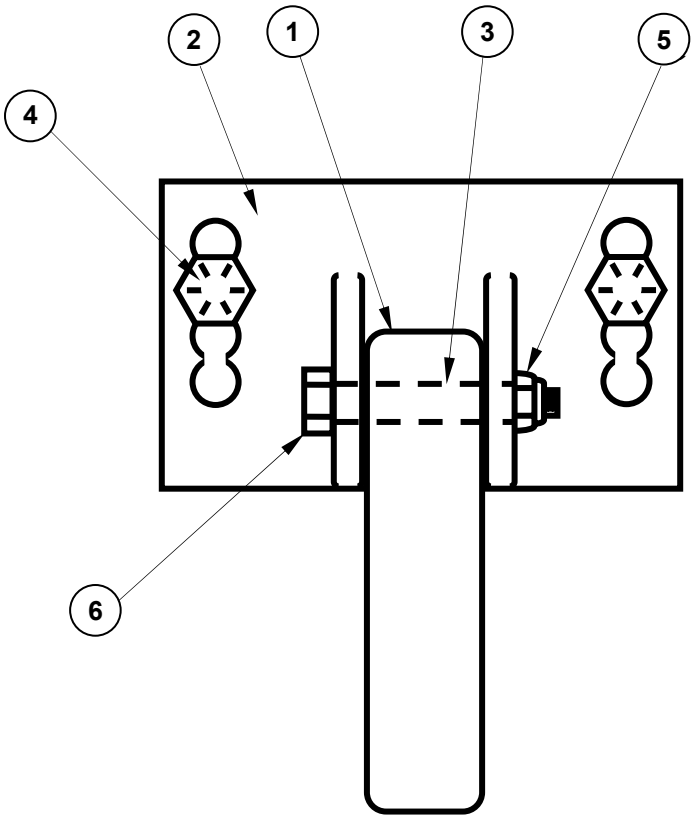
Leg Assembly

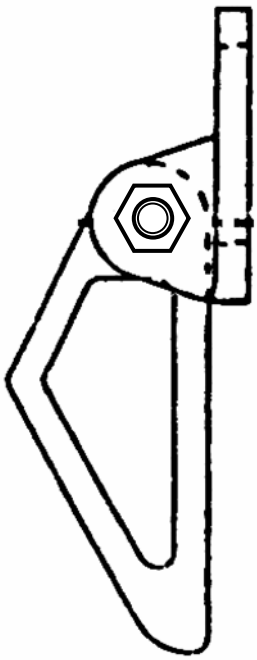
	Part No.	Description	Qty
30	252-002-105	Leg Assembly	1



612-520-063
Lower Ball Rack (Optional)

	Part No.	Description	Qty
1	612-520-063	PROfile lower ball rack (includes items 2, 3, & 4)	1
2	814-847-480	Wood screw, #14 x x3, black	2
3	730-070-375	Nut cap, 3/8	2
4	810-564-480	Lag screw, 3/8 x 3	2

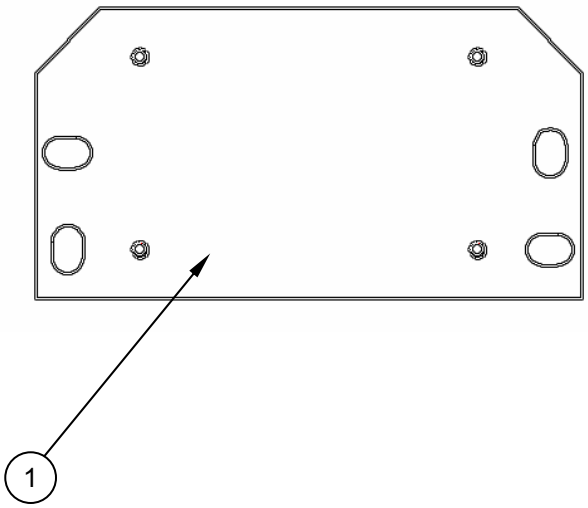




Side View

611-353-105
Underlane Return Ball Stop

	Part No.	Description	Qty
1	135-001-002	Ball stop	1
2	135-001-003	Ball stop bracket	1
3	135-001-004	Tube	1
4	810-556-240	5/16 x 1-1/2 Lag screw	2
5	844-057-002	5/16-18 Stover lock nut	1
6	809-857-365	5/16-18 x 2-1/4 Hex screw	1



049-006-359
Rail Adapter Plate

	Part No.	Description	Qty
1	049-006-359	Rail adapter plate	1