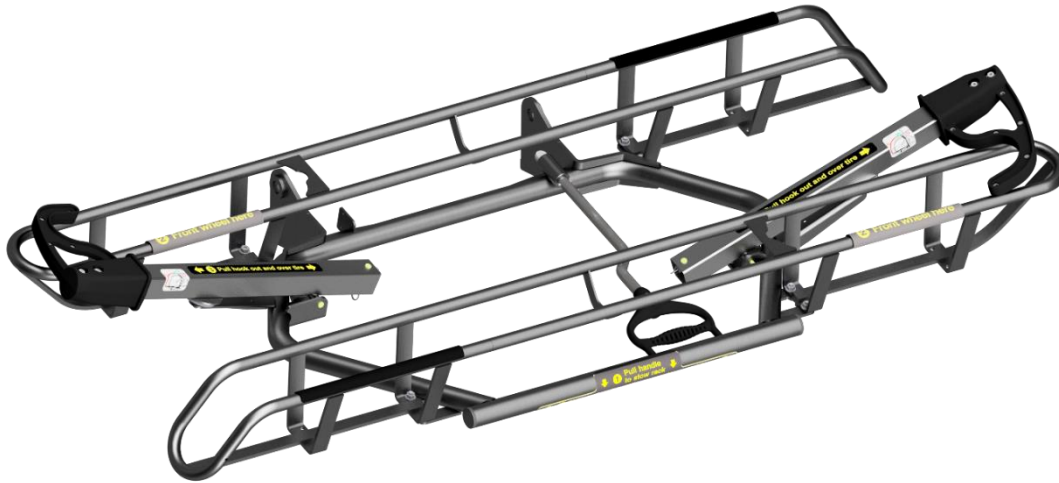


# Apex 2™ 2-Position Bicycle Rack

## Operation and Maintenance Instructions



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## 1. SCOPE OF THIS DOCUMENT

This document applies to all Apex 2 bicycle racks. The Apex 2 product line includes 2-position bike racks with stainless steel frames, wheel trays, and support arms. There are two primary versions of the Apex 2 – one with standard trays and support arms, the other with fat tire compatible trays and support arms.

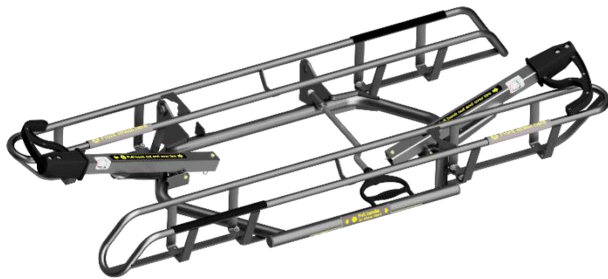


Figure 1, Apex 2 with standard trays and support arms

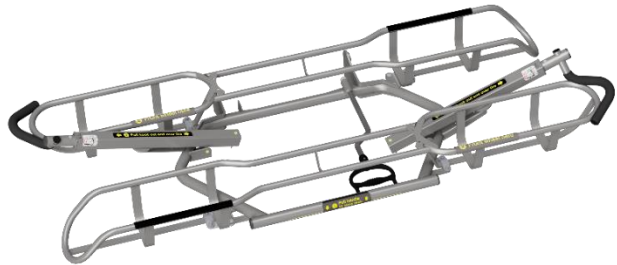


Figure 2, Apex 2 with fat tire compatible trays and support arms

### Part Numbers:

101082(-XXX)	Apex 2 with standard trays and arms
101082-FAT(-XXX)	Apex 2 with fat tire compatible trays and arms for both tray positions.
101082-FATF(-XXX)	Apex 2 with a fat tire compatible tray and arm on the front position (farthest from the vehicle front), and a standard tray and arm on the rear position.
101082-FATR (-XXX)	Apex 2 with a fat tire compatible tray and arm on the rear position (closest to the vehicle front), and a standard tray and arm on the front position.

## 2. INSTALLATION

The installation is crucial to the safety and performance of the Sportworks bike rack system. There are several factors to consider when mounting the rack, including:

- Load height
- Approach angle
- Protrusion and Turning radius
- Bicycle/wiper clearance
- Front mask clearance
- Footprint/headlight clearance

Carefully review the following information regarding the positioning of the rack on the bus before beginning the installation process.

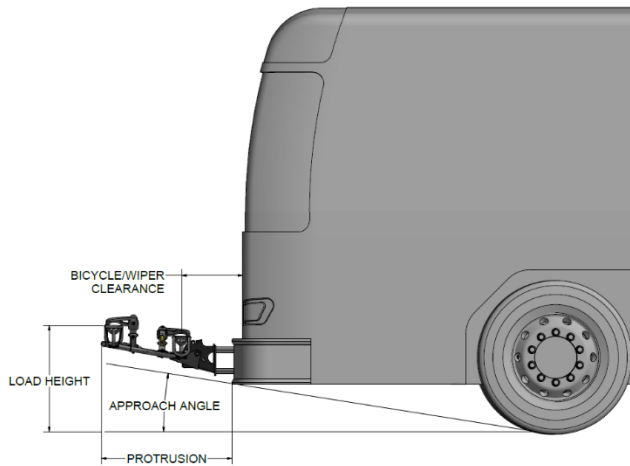


Figure 3, Factors to Consider During Installation

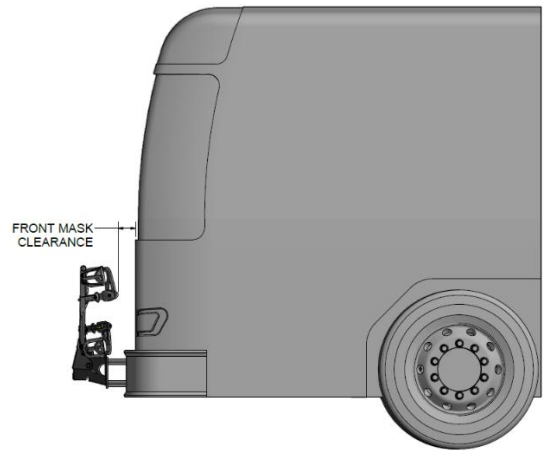


Figure 4, Front Mask Clearance

### Load Height

The load height is the vertical distance a bicycle must be lifted for placement in a deployed bike rack. If the rack is mounted too high, some riders may have difficulty loading the rack.

### Approach Angle

The approach angle is the angle created by a line from where the front tire contacts the pavement to the first obstruction ahead of the front tire. This obstruction would first touch the pavement when transitioning from flat to a very steep hill. APTA standards require a minimum approach angle of 8°, although some agencies in hilly areas may prefer a 9° approach angle. The bike rack will limit the approach angle if it is installed on the bumper in a position that is too low. The bike rack installer should be aware of this possibility and investigate approach angle requirements before mounting the rack.

### Protrusion

Protrusion measures the distance from the front of the bumper to the front edge of the bike rack in the deployed position. Once the bike rack is mounted to the coach, the protrusion distance is fixed. Protrusion is a measurement that requires attention due to the overall length, approach angle and turning radius. Protrusion is not typically an issue with 2-position racks, however if you have any questions or concerns, please contact us.

### Bicycle/Wiper Clearance

It is important to ensure that the handlebars of a loaded bicycle do not interfere with windshield wipers. A minimum of sixteen inches of horizontal distance is recommended between the center of the wheel tray and the wiper arms.

### Front Mask Clearance

Front mask clearance is the clearance between the stowed rack and the wiper mechanism or front-most part of the bus mask. A minimum of 2 inches clearance is recommended, although some vehicles may have unique requirements.

### Stowed Position / Headlight Clearance

Figure 5 shows an outline of the Apex 2 against a bus front when the rack is in the stowed position.

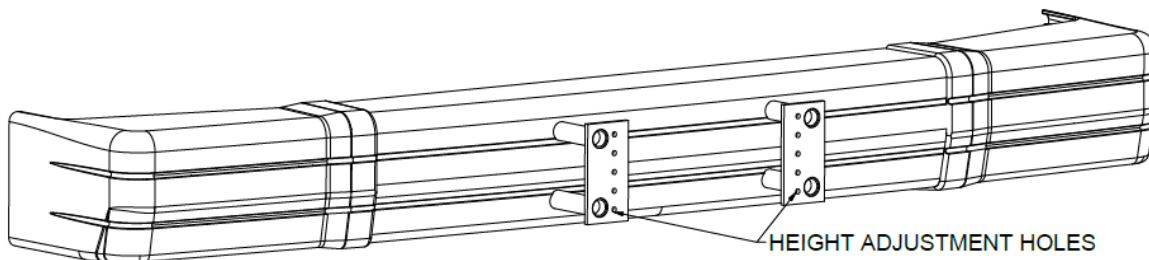
Obstruction of headlights and turn signal indicators should be avoided. The position of the rack can be adjusted. Remove the bike rack from the pivot plate. Remove the pivot plate from the C-brackets or other bracket pieces and position the pivot plate up or down as required. Remount the pivot plate to the bracket pieces and the rack to the pivot plate.

Some bracket assemblies may not have multiple height adjustment holes. If this is the case, the bracket assembly is designed for an optimum position in terms of minimal headlight interference and proper loading height and adjustment is not required.

Figure 5, Front View of Bus



Figure 6, Height Adjustment

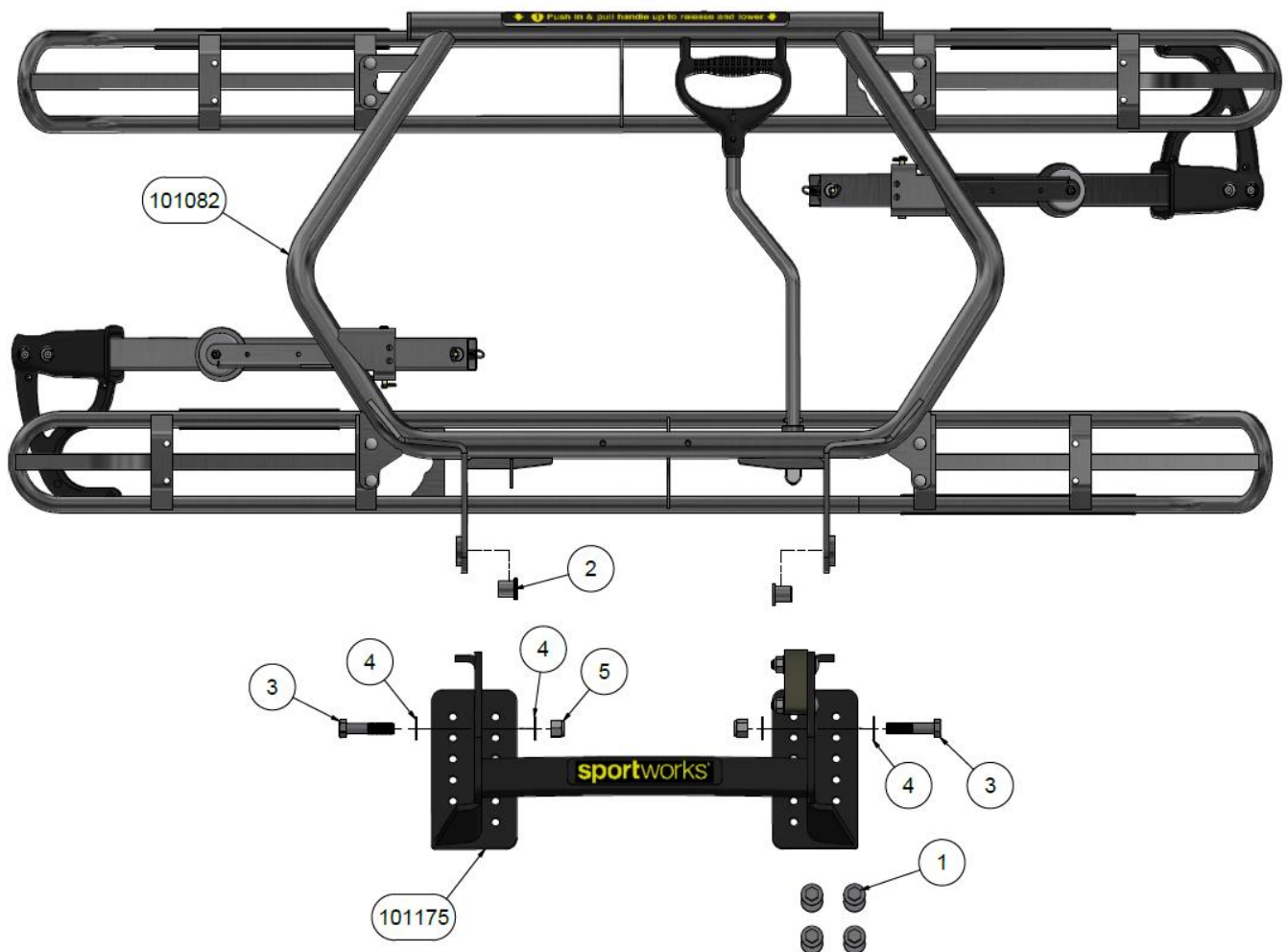


## a) Mounting the Rack

1. Install pivot plate using supplied hardware Item #1 and 14" or 18" hole pattern.
2. Install pivot tab bushings Item #2 in rack with flanges inside.
3. Place rack on pivot plate in stowed (up) position. The pivot plate will support the rack while you insert the fasteners.
4. Insert the supplied fasteners Items 3, 4 and 5. Insert the supplied fasteners and torsion spring Items 6, 7, and 8. The bent end of the torsion spring hooks into the pivot plate and the large end of the torsion spring mount Item #7 should be toward the nut.
5. Torque 1/2"-13 bolts to torque values listed in General Torque Specs section.

**Note: Standoffs can shift during service because of impacts. When installing the Apex pivot plate on pre-installed standoffs, it may be necessary to loosen the standoffs from the back bumper structure to align them to the 14" and 18" hole pattern. Bolt the pivot plate to standoffs, and tighten standoff bolts.**

Figure 7, Apex 2 Rack and Standoffs



## General Torque Specs

Most brackets attach to the bus bumper using Grade 8 ½-13 HHCS. Standard pivot plates are attached to the brackets using Grade 8 3/8-16 HHCS.

Recommended torque values:

- ½-13 Grade 8 – 80-90 FT-LB
- 3/8-16 Grade 8 – 30-40 FT-LB

If you are using quick-release hardware to attach the bike rack to the pivot plate or are using a Ten Second Bracket (TSB), tighten the knobs by hand as tightly as possible and do not tighten with tools.

## 3. OPERATING THE BIKE RACK

All loading and unloading of bikes can be accomplished by the rider. Loading of children's bikes shall be supervised by an accompanying adult.

### b) Bicycle Loading

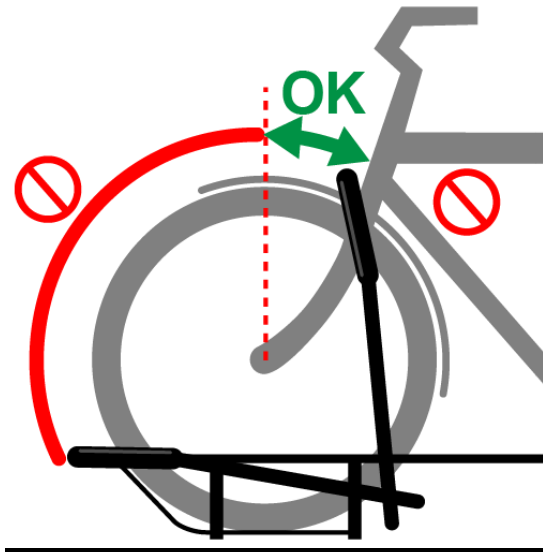
1. Prepare the bicycle by removing water bottles, pumps, panniers, bags, and other loose items that could fall while the vehicle is in motion.
2. Indicate to the operator that you will be loading your bike. Bikes should be loaded from the curbside or from in front of the vehicle. Do not step beyond the vehicle into passing traffic to load your bike
3. If the rack is in the stowed (vertical) position, squeeze the latch handle to release the latch, then pull the bike rack down to the loading position. Only one hand is required to unlatch and pull the bike rack down. This enables users the ability to support the bike (it is not necessary to lean the bike against the transit vehicle.)
4. Lift the bike onto the bike rack, fitting the front wheel into a wheel slot labeled for the front wheel. The purpose of the directional placement is to make adjacent bikes easy to load and unload.
5. Raise the support arm hook over the front tire. The support arm will keep the bike secure while the vehicle is in motion.

**NOTE: The support arm hook must be between the highest point of the tire and the head tube. Incorrect placement may result in the bike falling from the rack, which could result in injury and/or damage to the bike, the vehicle in operation, and other vehicles.**

If the bicycle has fenders, place the support arm hook over or under the fender as required to achieve the correct hook position.

Some accessories such as front racks and baskets with vertical support stays may preclude correct hook placement. Bikes with accessories that conflict with correct support arm placement must NOT be loaded onto the rack.

Figure 8, Proper Placement of Support Arm



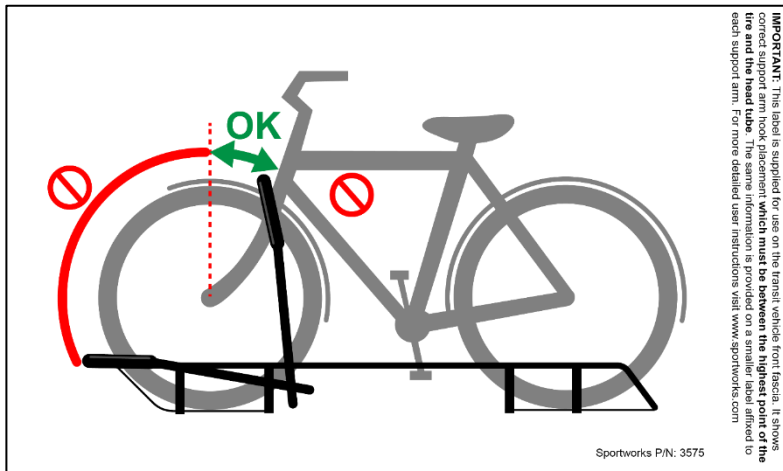
### c) Bicycle Unloading

1. Indicate to the operator that you will be unloading your bike as you approach your stop. Bikes should be unloaded from the curbside or from in front of the vehicle. Do not step beyond the vehicle into passing traffic to unload your bike.
2. Raise the support arm hook off the tire and return it to its stowed position.
3. Lift the bike out of the bike rack.
4. Step away from the transit vehicle with your bike onto the curb.

**NOTE: LOADING OR UNLOADING A BIKE FROM THE STREET SIDE OF THE TRANSIT VEHICLE MAY CAUSE INJURY OR DEATH.**

Sportworks label (part no. 3575) shown in Figure 9 is available for use on the transit vehicle front fascia. The label measures 9.5 inches by 6.0 inches. It contains the same graphic in a larger format as the label affixed to each support arm of the rack.

Figure 9, Instructional Label with Support Arm Placement Instructions



### Supported Bike Dimensions and Weight Limits

To ensure safe bicycle fit in the Apex 2 rack, each bicycle must comply with the following:

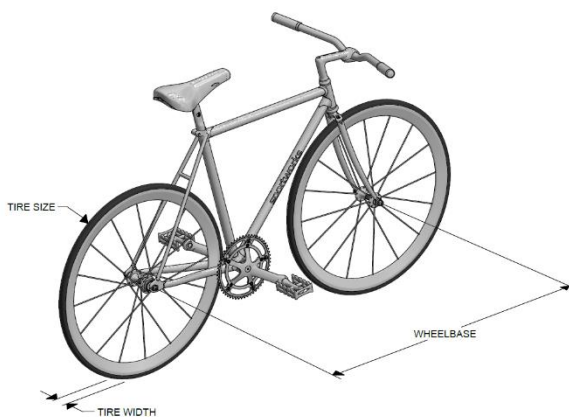
#### Apex 2 with standard trays and support arms:

- Wheelbase (max): 48.0in
- Tire width (max): 3.2in
- Tire size (min-max): 16-29in (incl. 700c)
- Weight (max): 75lbs per bike

#### Apex 2 with fat tire compatible trays and support arms:

- Wheelbase (max): 48.0in
- Tire width (max): 5.5in
- Tire size (min-max): 24-29in (incl. 700c)
- Weight (max): 75lbs per bike

Figure 10, Reference for Supported Bicycle Specifications





## 4. USE OF THE BUS WASH

Sportworks racks have been designed to safely pass-through bus wash facilities. Before taking a newly mounted bike rack through a wash facility, the operator should check to ensure that the wash facility is properly set up for washing the bus with a rack on it.

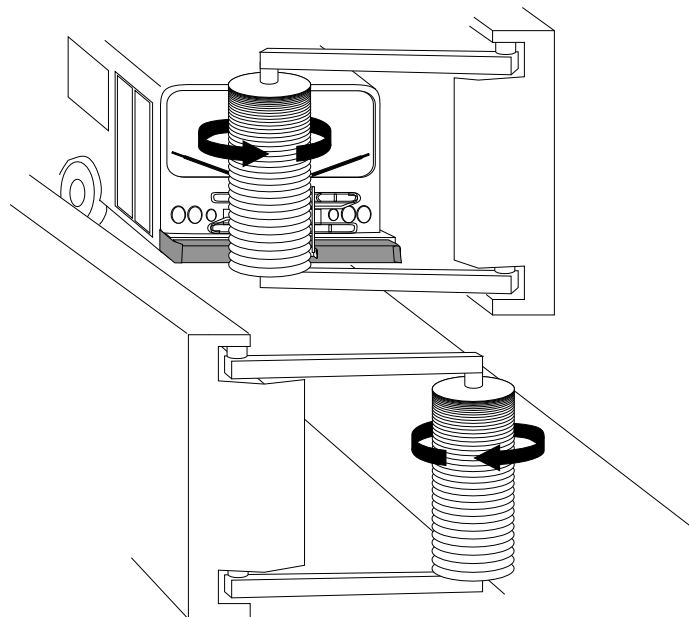
Most wash systems use either a "top fixed" or "top and bottom fixed" spinning brush system. The Sportworks rack has been designed with round tubing and round edges so that the wash brushes contact surfaces that will not catch or tear them.

Some conditions may cause excessive wear or harm to the bike rack or the wash system. This is typically due to brush entanglement with the rack. These best practices should be followed to avoid damage:

1. Ensure brushes are spinning at an adequate RPM. If the brushes are rotating too slowly, it may cause the brushes to hook on protruding objects. If the axle of the brush assembly pushes against the rack or any part of the bus that has a crevice, it may allow bristles to become entangled.
2. Ensure the vehicle enters the wash system slowly to minimize impact between the rack and the brushes.
3. Replace and maintain brushes at recommended intervals. Low brush density can also cause entanglement.
4. Ensure proper brush rotation. Refer to Figure 1. The illustration shows the recommended rotation for the brush assemblies. If the brush assembly is fixed to the driver's side, the brush should rotate counterclockwise, as viewed from the top. If the brush assembly is mounted on the curbside, the brush assembly should rotate clockwise.

When operating as recommended, no unusual deterioration should occur. If damage occurs, take time to examine the rack installation as well as the vehicle and setup of the wash facility. Please contact Sportworks at 425-483-7000 for assistance.

Figure 11, Bus Wash Brush Orientation



## 5. INSPECTION AND MAINTENANCE

### a) Visual Inspection Checklist

The following is recommended to ensure an operable bike rack prior to use. These instructions are intended for use as an inspection sheet for operators.

Examine the items below before operating the vehicle. If the bike rack does not function as described, service is recommended before continuing operation. Refer to Figure 11, Location of Rack Components for the location of each item (as numbered below)

1. \_\_\_\_\_√ PIVOT BOLTS ARE TIGHT  
Tighten if required.
2. \_\_\_\_\_√ ENDPLUGS ARE PRESENT (2 PLACES)  
Replace plugs if missing or damaged.
3. \_\_\_\_\_√ CLEVIS PINS AND SPLIT RINGS ARE PRESENT  
SECURE ARMS TO FRAME (2 PLACES)  
Replace missing parts.
4. \_\_\_\_\_√ SUPPORT ARM MAGNETS ARE PRESENT (2 PLACES)  
Replace if missing. These magnets stow the support arms.
5. \_\_\_\_\_√ IF OPTIONAL BIKE COUNTERS ARE INSTALLED:  
SENSOR MAGNETS ARE PRESENT (2 PLACES)  
Replace if missing. These magnets engage with the bike counters.
6. \_\_\_\_\_√ SUPPORT ARMS SLIDE IN/ OUT (2 PLACES)  
Hooks move smoothly in/out and self-stow on magnet.  
DO NOT LUBRICATE.
7. \_\_\_\_\_√ SUPPORT ARM SIDE PLAY NOT EXCESSIVE  
Verify that the support arm side to side play is less than 1.5" (measured at the hook with the support arm retracted, but not resting on the magnet). If play is excessive, there are several possible causes including: Broken or bent support arm bracket; Missing, bent, worn or broken hinge clevis pin - ensure clevis pin is held in place with hairpin clip; Bent or broken support arm spar; Worn or missing bushings in the support arm housing. Missing or damaged components should be replaced.
8. \_\_\_\_\_√ LATCH HANDLE OPERATES PROPERLY  
Latch is easy to release and does not get stuck.
9. \_\_\_\_\_√ BIKE RACK SWINGS FREELY AND LOCKS IN TWO POSITIONS  
Rack pivots and locks in both the deployed and stowed positions.

Figure 12, Location of Rack Components

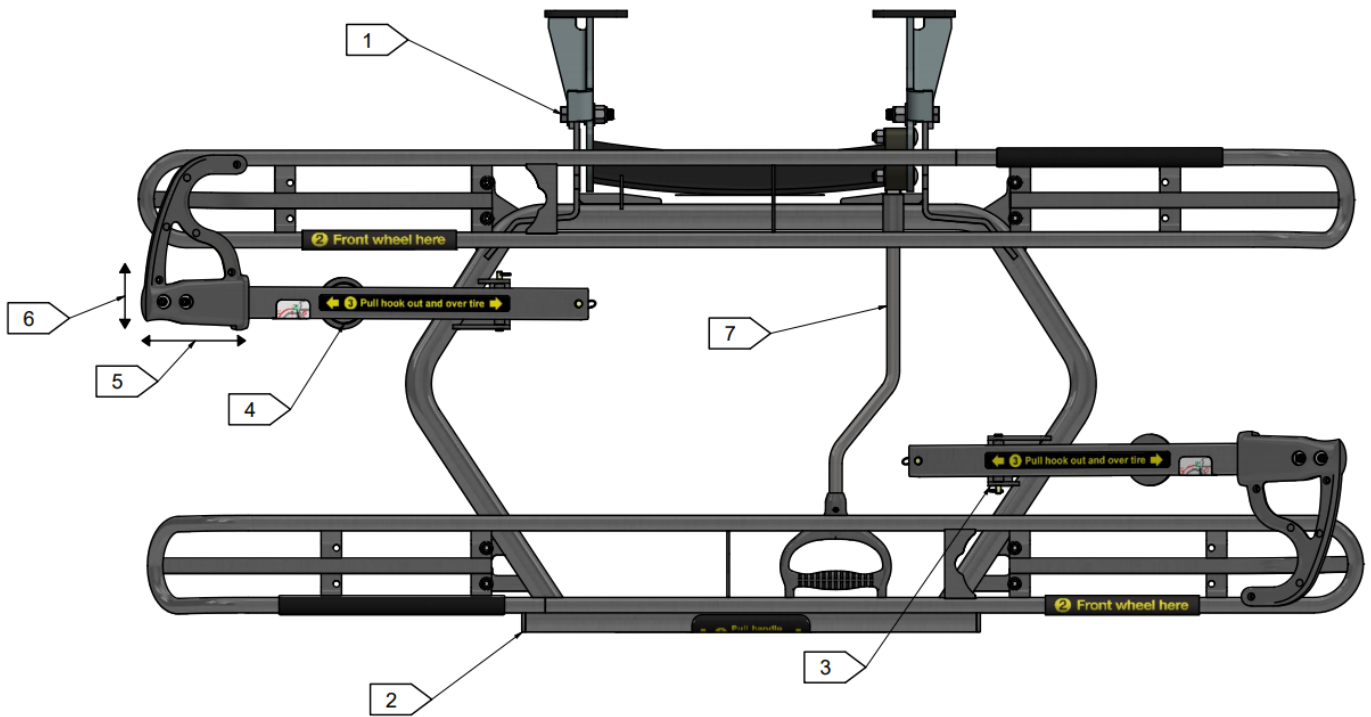
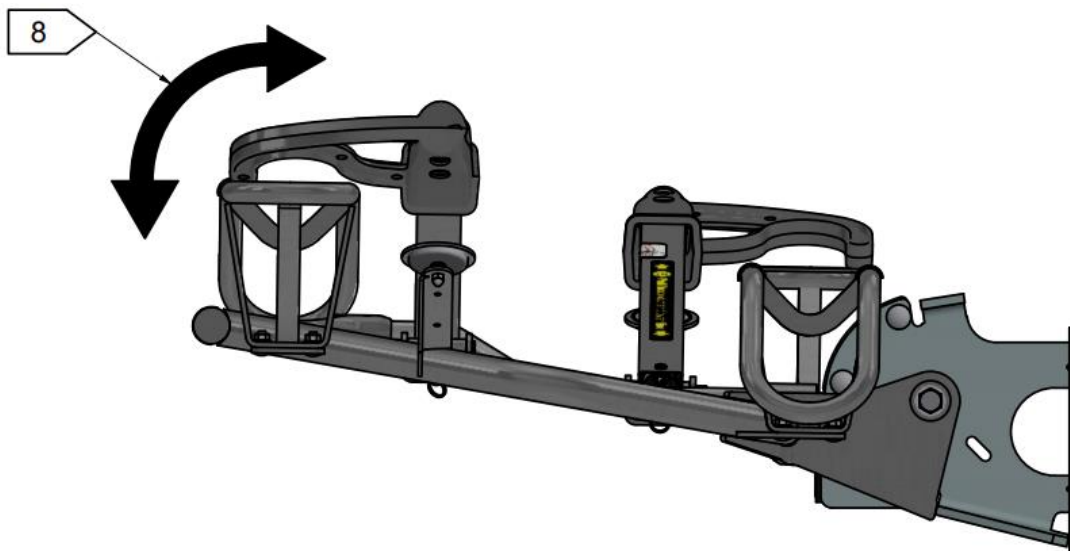


Figure 13, Side View of Rack Components



## b) 30 Day General Maintenance Inspection & Service

The bike rack system requires minimal service. The following maintenance inspection and service is recommended every 30 days.

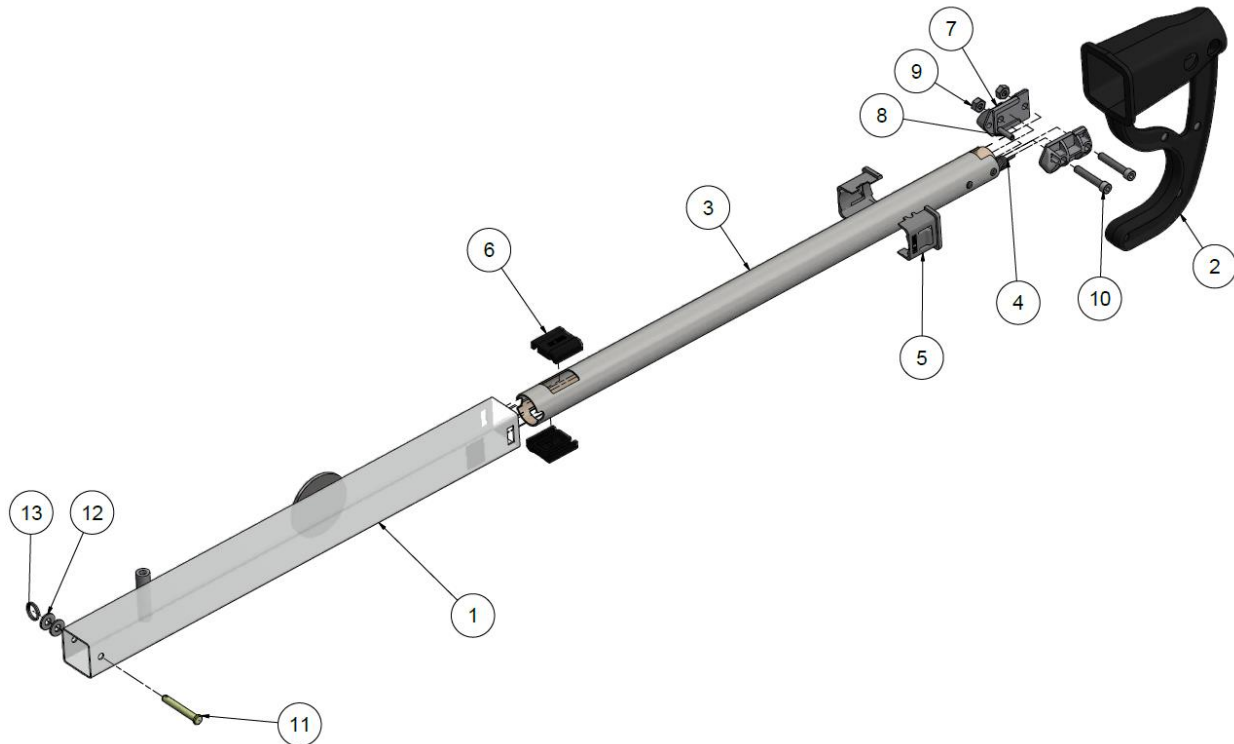
**NOTE: DO NOT LUBRICATE any part of the bike rack. Lubricants may trap dirt/dust and inhibit the function of the rack.**

1. The rack swings freely and smoothly between the deployed and stowed positions.
2. The release latch easily unlatches, and the latch pin does not stick in the released position. If sticky, see section on servicing the latch handle.
3. The release latch automatically locks the rack in place when moved to the deployed or stowed positions. If problems are encountered, see section on servicing the latch handle.
4. Each support arm hinge allows the support arm to raise and lower without undue constraint. Inspect support arm clevis pin located at the lower end of the support arm. Inspect for wear in the area that the pin contacts the square support arm housing and also near the split ring. If wear is evident replace pin, washers, and the split ring. See section on servicing the support arm for further detail.
5. Each support arm magnet properly mates with and holds the support arm.
6. Each support arm hook pulls out smoothly, easily slides back into the stowed position, and properly self-stows on the magnet when it is released. If resistance is encountered, see section on servicing the support arm for further detail.
7. Verify that the Support Arm side to side play is less than 1.5" (measured at the hook with the arm retracted, but not resting on the magnet) and that side-to-side play does not allow the sensor magnet to contact the bike counter sensor. Possible Causes: Broken or bent support arm bracket. Missing, bent, worn or broken hinge clevis pin, ensure clevis pin is held in place with hair pin clip. Bent or broken support arm spar. Worn or missing bushings in the support arm housing.
8. Both pivot bolt assemblies are tight. If there is excessive wear or cracks in the pivot bushings, replace them immediately.
9. All fasteners are tight on the bike rack and mounting bracket, including hardware for the trays, quadrant, pivot plate to bracket pieces, and bracket pieces to bumper or coach body.
10. There are two black plastic end plugs inserted into the main frame of the rack located at either end of the lowering tube (the tube one grabs to engage the release latch). Replace if missing.
11. The instruction labels on the rack are intact. Replace if shredded, partially removed, non-readable, or not adhering properly. Clean the rack surface thoroughly (isopropyl alcohol) before replacing. Pay particular attention to the chain guard sticker.
12. If surface rust develops on stainless steel use naval jelly for removal.
13. If optional bike counter kit is installed, counter magnets are in place and aligned with magnetic switch. There is a 1/8"-3/8" gap between the magnet and the switch.

## 6. SUPPORT ARM AND LATCH MECHANISM

**NOTE:** The standard support arm is shown, fat tire tray compatible support arms have some different components. See Apex 2 Parts and Options Breakdown for more information. Contact Sportworks for replacement parts.

Figure 14, Location of Support Arm Components



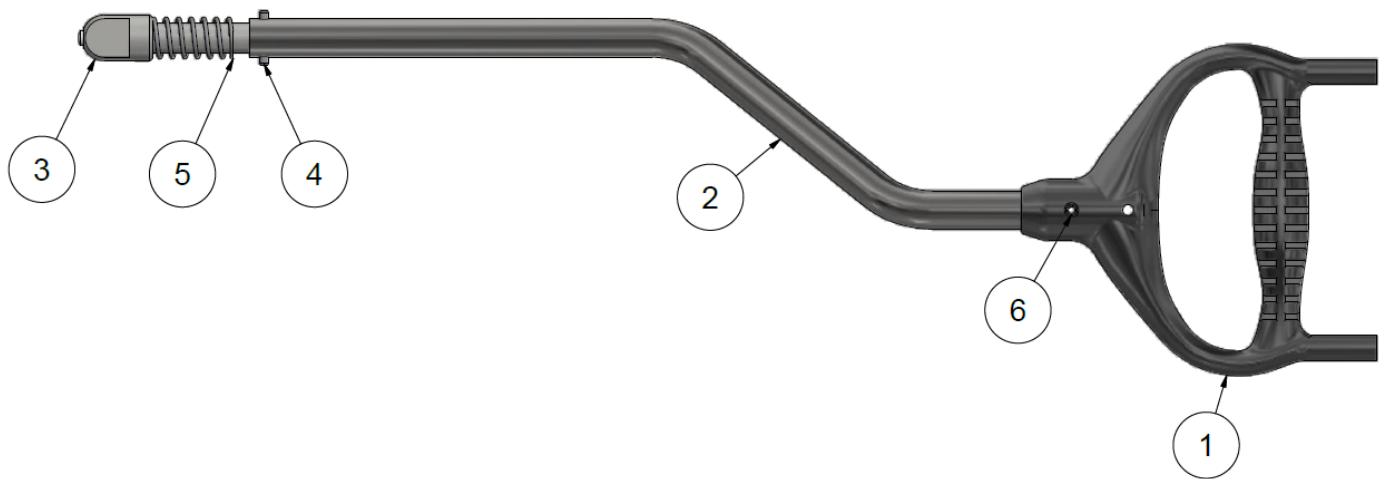
ITEM NO.	QTY	PART DESCRIPTION
1	1	Weldment, Apex Support Arm Housing, Shot Peened
2	1	Support Arm Grip, Apex
3	1	Support Arm Spar, Apex
4	2	Support Arm Spring
5	2	Apex Upper Bushing
6	2	Apex Lower Bushing
7	2	Shank Support, Apex Support Arm Hook
8	1	Pin, Roll, 5/32 x 0.75, SS
9	2	Nut, ¼-20 Deformed Thread, Self-Locking, SS
10	2	SHCS, .250-20 X 1.75
11	1	Pin, Clevis, 0.25 x 1.75
12	2	Washer, Flat, ¼ SAE, SS
13	1	Ring, Split, 0.670 O.D. x 0.051 Wire Dia, SS

## a) Servicing the Support Arm

1. Replace the spar tube if it is bent. The arm may bind if bent. **DO NOT LUBRICATE.**
  - a. Remove the split ring from the clevis pin in the support arm pivot.
  - b. Remove the split ring (13) from the clevis pin (11) at the bottom of the support arm housing. Remove the clevis pin.
  - c. Remove the fasteners (10) from the support arm grip and remove the grip from the top of the spar. Carefully slide the stainless-steel spar out the bottom of the support arm housing. Make note of how the two sets of nylon bushings (5) and (6) fit in the assembly.
  - d. Pull the shank support (7) out the top of the spar to free the support arm spring. Clean the spring and examine it for wear, overstress, and cyclical fatigue. Pay special attention to the end hooks of the spring. Replace the spring as necessary.
  - e. Clean the inside of the stainless steel support arm housing (1) using a stainless steel brush. Do not use a non-stainless wire brush.
  - f. Examine the two nylon bushings (6) that are inserted in the base of the spar. Replace them if they are excessively worn or marred.
  - g. Re-assemble the support arm in the reverse order of steps a-d. Use needle nose vise-grips similar tool to pull the spring into position when re-inserting the clevis pin (11) through the base of the support arm housing and the end hook of the spring.
  - h. Check the operation of the support arm once again. Each support arm hook should pull out smoothly, easily slide back into the stowed position, and properly self-stow on the magnet when it is released.
2. Replace the spar tube if it is bent. The arm may bind if bent. **DO NOT LUBRICATE.**
3. Examine the support arm pivot. Check clevis pin for wear. Replace if damaged or worn.
4. Examine the rubber grip. Replace it if ripped, gouged, or bent.

## b) Servicing the Apex 2 Latch Mechanism

Figure 15, Location of Support Arm Components

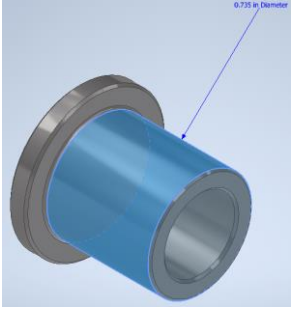
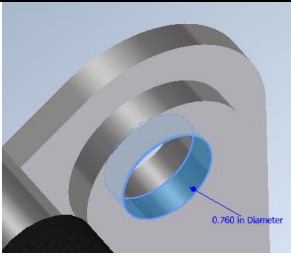
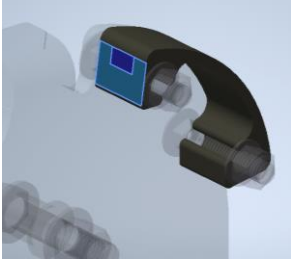
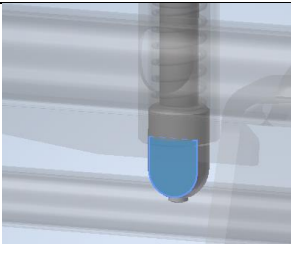
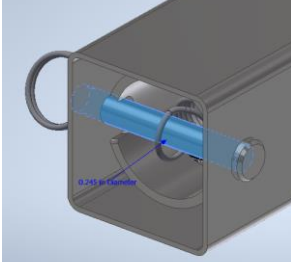


ITEM	QTY	TITLE
1	1	Molded Latch Handle - Black
2	1	Tube, Apex 2 Latch Handle
3	1	Apex Latch Pin Sub-Assy
4	1	PIN, ROLL, .15625 OD x .875, 18-8 Stainless
5	1	SPRING, Compression, for DL2 Latch, Stainless
6	1	PIN, ROLL, .1875 x 1, 18-8 Stainless

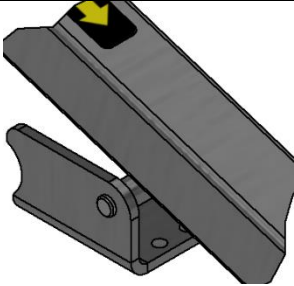
1. Check that the release handle operates smoothly.
2. Examine the wear of the plastic insert in the tip of the latch pin (Latch Pin Rivet). If the latch quadrant is being marred by the latch pin, replace the Latch Pin Sub-Assembly (PN 3604).
3. Examine the components inside of the latch housing.
  - a. Remove the roll pin attaching the latch stem to the latch pin.
  - b. Pull on the release handle to separate the latch stem from the latch pin.
  - c. Check the wear on the spring. Clean the spring and replace it if it is distorted or not functioning properly.
  - d. Remove any dirt and debris from inside the latch housing.
  - e. Re-assemble the latch mechanism in the reverse order of steps a-c.

**NOTE: DO NOT LUBRICATE.**

## 7. WEAR LIMITS

Item/Description	Image	Design Dimension	Wear Limit	Maintenance Action
5240 – Flange Bearing		Outer Diameter: Ø0.735+/-0.001"	Ø0.730"	Replace bushings
Pivot Tab Bore		Inner Diameter: Ø0.760+/-0.005"	Ø0.775"	Replace Bike Rack
3598-BLK - Quadrant		Mating surface: Flat	Worn groove exceeding .03" deep	Replace quadrant
3604 – Latch Pin		Mating surface: Flat	Visible damage or worn groove exceeding .03" deep	Replace latch pin
2558 – Clevis pin		Outer Diameter: Ø0.243- Ø0.248	Ø0.242"	Replace pin



Item/ Description	Image	Design Dimension	Wear Limit	Maintenance Action
2559 – Clevis pin		Outer Diameter: Ø0.245- Ø0.248	Ø0.242"	Replace pin

### DOCUMENT REVISION HISTORY

12/29/2020 – Initial release

1/25/2021 – Added wear limits table and additional do not lubricate statement

3/11/2022 – Increased maximum weight limit to 75 lbs per position

8/29/2023 – General updates to copy and drawings

## 8. CONTACT INFORMATION

Additional information can be found on Sportworks website: [www.sportworks.com](http://www.sportworks.com).

For assistance, contact Sportworks by phone: 425-483-7000 or email: [salesandsupport@sportworks.com](mailto:salesandsupport@sportworks.com).